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ABSTRACT

This occupational safety and health handbook is designed for use as an educational tool in safety and health training classes for road workers. The first of six major sections, Caution Work Ahead, identifies principles of controlling hazards and discusses how the law can help improve safety and health conditions. Section 2 describes three common safety hazards: traffic; vehicles, equipment, and tools; and fire. Health hazards such as chemicals, noise, weather, and stress are discussed in the third section. The fourth section explores methods for using the union to improve safety and health on the job. Specific topics discussed include the grievance procedure, health and safety committees, labor management committees, and doing research. Section 5, Minimizing the Effects of Hazardous Work, explains emergency medical procedures, detection of long range illness, workers' compensation, disability insurance, and other legal actions. The final section provides a resource list for more information and help on specific problems. A glossary of unusual and technical terms is appended. (LRA)

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ON THE ROAD TO SAFETY AND HEALTH

A Manual for Road Crews

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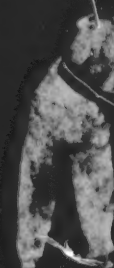
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DISTRICT COUNCIL 37, AFSCME
140 Park Place
New York, N.Y. 10007**

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ON THE ROAD TO SAFETY AND HEALTH

A Manual for Road Crews

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A DC 37 Occupational Safety and Health Publication

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FOREWORD

The most important resource of any social institution is its people. Unfortunately, most of our institutions have grown so big that they often put their human resources at the bottom of their list of priorities.

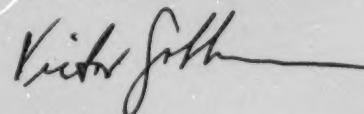
The result of this approach, or lack of an approach, is most tragically evident when unsafe working conditions cause injury or illness or even death to a worker. And the statistics tell us this happens in an appallingly great number of cases. The tragedy is that most accidents and illnesses in the workplace can be prevented.

Because our union is basically oriented towards human beings and their welfare, we have always been alert to potential dangers on the job. By and large, however, we have handled these problems on a case-by-case basis, and not, as they should be handled, in a broad and systematic way.

Our dissatisfaction with this situation led us to look for help, and we have found it. With financial support from the federal government we are building a full-scale occupational safety and health department, one of whose main functions is education of our members about potential workplace hazards and their elimination.

This manual is only the first of a series that will address the needs of DC 37 members. It is part of a program to train shop stewards in health hazard awareness and build safety and health committees that will work towards improved working conditions for our members.

The federal government's recognition of our efforts indicates that we're in the vanguard of developing occupational health and safety programs for public employees. What we do will mean gains not only for our own members but for public workers in other unions here in New York as well as AFSCME nationally. And we can all take pride in that.



Victor Gotbaum
Executive Director
District Council 37
AFSCME, AFL-CIO

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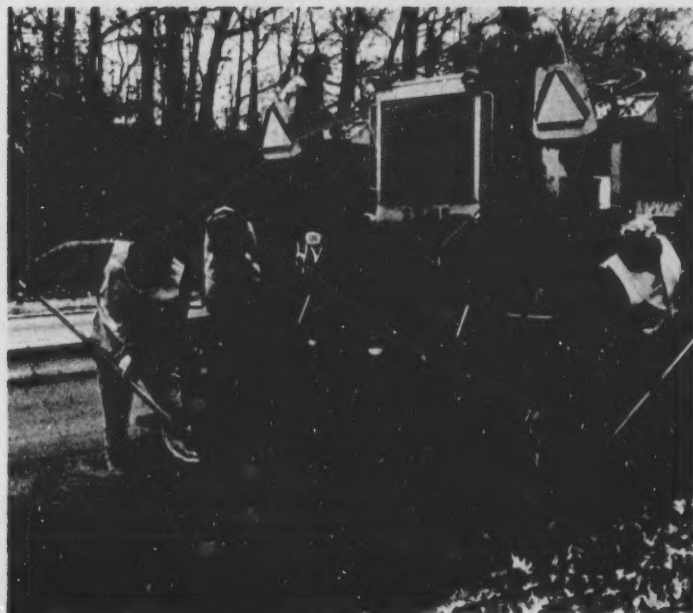
We would also like to thank Deputy Commissioner David Love, New York City Department of Transportation and Deputy Commissioner Thomas Guthrie, New York City Department of Traffic and their staffs, particularly Jerry Angoglia and John Cannon, respectively, for helping to arrange access to the work sites.

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Introduction

We'll be laying asphalt on a hot summer day and we get a little rain, just a shower. The steam that comes up—you can't see anything. That's when you get burned. You have those fumes coming up in your face and you have no wind. You breathe it right in. You go to spit and you're spitting out that asphalt. You blow your nose and you're blowing out black soot.

—A pothole repairer in Brooklyn

I killed a man on the job. I backed up my truck in the yard. I couldn't see him. He didn't see me. I crushed him against the wall. After, the department put backup beepers on the trucks. Why didn't they put them on before?

—A Motor Vehicle Operator (MVO) working with Highway Repairers (HRs) in Queens

These experiences are real and could happen again. As a Highway Repairer (HR), Traffic Device Maintainer (TDM) or Motor Vehicle Operator (MVO) you may face unsafe and unhealthy work conditions every day. Working on public highways and streets, you risk traffic accidents, falls, burns, diseases from chemicals, back problems, hearing loss and other injuries and illnesses.

You do not have to take these risks to earn your paycheck. Many of these safety and health hazards can be eliminated. Others can be reduced. Together, you and your co-workers can improve your working conditions.

On the Road to Safety and Health presents information that will help you identify and correct the safety and health hazards on your job. It does not provide specific solutions to each and every health and safety problem faced by Highway Repairers and Traffic Device Maintainers. It would be impossible to do so. Your jobs and worksites are too numerous and varied to be covered adequately. Suggested changes in work processes, equipment and tools may be useful in some situations but create new dangers in others.

Most importantly, written health and safety standards and procedures will protect you only if they are adopted by management and enforced by management, your union,

and you. (Even workers who are covered by OSHA have learned that the law is meaningful only if they understand and enforce it.) Like any other tool you use, *On the Road to Safety and Health* cannot do the job itself. The thought and energy of you and your co-workers is required to help get the task done.

On the Road to Safety and Health is a guidebook for action. Each section provides detailed information and principles on an aspect of hazard recognition and resolution. They are:

Caution Work Ahead

- Principles of Controlling Hazards
- The Law Can Help

Common Safety Hazards and their Control

- Traffic
- Vehicles, Equipment and Tools
- Fire

Common Health Hazards and Their Control

- Chemicals and Toxic Substances
- Noise
- Weather
- Stress

Using Your Union—how to join with co-workers and DC 37 representatives and local officers to improve safety and health on your job.

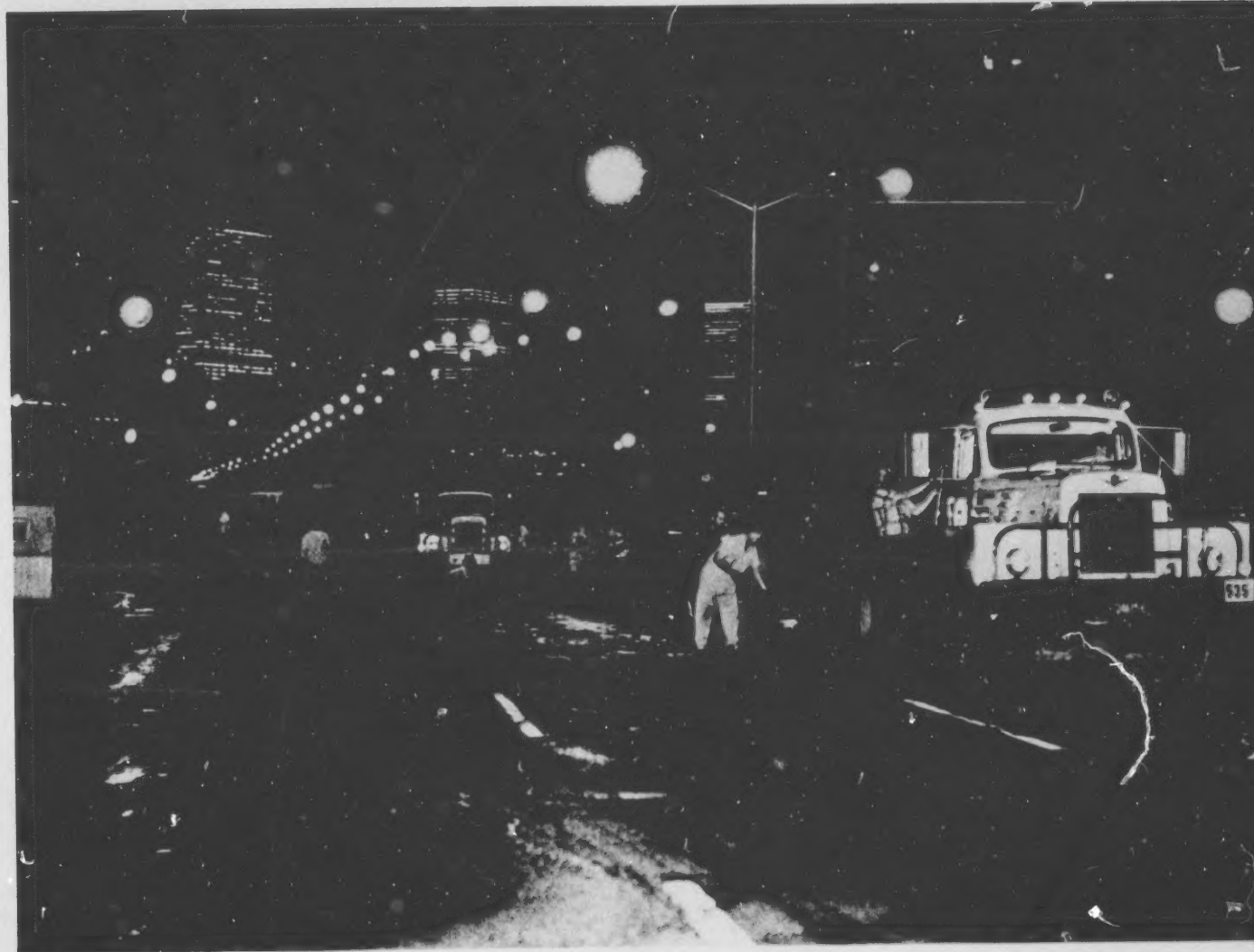
- The Grievance Procedure
- Health and Safety Committees
- Labor-Management Committees
- Doing Research

Minimizing the Effects of Hazardous Work—how to reduce the physical and economic hardships of an occupational injury or illness.

- Emergency Medical Procedures
- Detection of Long-range Illness
- Workers' Compensation
- Disability Insurance
- Other Legal Actions

Resource List—how to get more information and help on specific problems.

Glossary—how to understand unusual or technical terms.



Caution Work Ahead

Have you noticed that you (or a co-worker) cannot run the bases like you used to without getting out of breath? Or work in your garden without getting a backache? Or paint some furniture without getting a rash? Or hear the T.V. without turning it up so loud that your family complains?

Your job may be the cause. The work processes, equipment and substances that you use can cause injuries ranging from occasional sprains to broken bones and illnesses ranging from a rash to cancer.

Most of these injuries and illnesses can be prevented. The hazards that produce them can be identified and eliminated or controlled. The following four chapters will help you and your health and safety committee to understand and detect hazards and to develop solutions.

Principles of Controlling Hazards

You probably already have good ideas about changes that should be made to improve your safety and health. Deciding which solution is best is

not always easy. Other times, you know the problem but not what to do about it. Some specific suggestions will be made later in this chapter. However, there are some general principles that are helpful to developing and evaluating hazard control methods.

Hazard controls can be divided into

three categories—engineering controls, administrative or work practices controls, and personal protective devices.

Engineering controls are changes in the worksite, work process or in the tools, materials, and equipment necessary to do the job. There are



several types of engineering controls:

- **Substitution or replacement.** Dangerous materials often can be replaced. A task may be done with a process that produces lower levels of noise, dust or fumes.
- **Isolation and enclosure.** Closed systems can be designed so that hazardous dusts or fumes are drawn away without ever entering the workplace air. Worksites can be set up so that very few workers have to enter an unsafe or unhealthy area. Guards may be placed on machine parts that are sharp or move rapidly.
- **Maintenance and housekeeping.** Hazards may be reduced by devoting more time to inspecting and maintaining or replacing vehicles, equipment and tools and to keeping the workplace clean.

Administrative controls. Rotation of workers in and out of the most hazardous jobs, frequent breaks and similar practices will not eliminate the hazard but will limit the exposure of an affected worker until a permanent solution can be found.

Personal protective devices focus on protecting the individual worker from an uncontrolled hazard. Gloves, respirators, goggles, ear muffs, steel toed shoes are all examples of personal protective devices.

Personal protective devices should be used only while other controls are being installed or developed and in emergencies, or if there is no other means of protection available.

Personal protective devices can present problems.

They do not always work. For example, a standardized mask may not

fit a worker with eyeglasses, a beard or a small face. If the mask does not fit, it will not block toxic gases or fumes. A respirator that protects against one chemical may not eliminate another.

They may create new safety and health problems. Ear plugs, for instance, may cause ear infections and outer ear canal problems; ear muffs are better but may shut out warnings. Gloves may trap caustic dusts or become saturated with hazardous liquids and promote burns or skin problems. Visibility may be reduced by goggles that become fogged or scratched during work.

They are often uncomfortable. Uncomfortable equipment or clothing may be bearable for a while. But worn day after day, it becomes annoying and the protection it offers does not seem to be worth the discomfort. Many workers do not wear their protective devices. (When was the last time you wore your vest?) But equipment does not protect when it is not worn.

The Law Can Help

There are several federal, state and city laws or rules and regulations that will help you and your health and safety committee to improve the safety and health conditions on your job.

Some of these laws require specific work processes such as minimum maintenance of motor vehicles, or warning signs and other devices during work on public roads and highways.

Others regulate specific hazards such as toxic substances or noise.

Still others establish procedures for resolving safety and health problems, such as collective bargaining and joint labor-management health and safety committees.

The Occupational Health and

Safety (OSH) Act is the major national legislation that protects worker health and safety. Unfortunately, employees of New York City are not covered by the OSH Act. The Act applies to public employees only when their state legislature adopts a state plan that extends coverage to them. New York State has not passed a state plan despite District Council 37's efforts to obtain one over the last several years.

Nevertheless the OSH Act is an important resource for you and your health and safety committee. The U.S. Occupational Safety and Health Administration has issued rules and regulations that implement the OSH Act. Many of these establish limits on exposure to hazards, and in some cases, requirements for particular ways of controlling hazards. While OSHA standards do not legally apply to New York's public employees, it is common sense that our employers ought to provide at least the protection OSHA requires. Toxic substances and dangerous procedures do not discriminate. They can hurt anyone.

Private sector employees have learned that the OSH Act, and other laws, are not a substitute for collective bargaining and active, strong health and safety committees. Unions often negotiate standards and procedures that are stricter than those required by law. There are too few government inspectors and enforcement officers to reach every workplace. Large fines or other punishment rarely are imposed. The grievance procedure frequently provides a swifter and surer remedy.

The first line of defense against occupational hazards is always the concerned, alert and educated worker. The laws that apply to specific safety and health problems can help you. They will be discussed in the sections that follow.



Common Safety Hazards

Results of a District Council 37 OSHA Project survey of Highway Repairer, Traffic Device Maintainer and Motor Vehicle Operator shop stewards, safety officers, and foremen showed that the most common safety hazards confronting you are: traffic; your vehicles, equipment and tools; and, fire. Many of these dangers can be eliminated or reduced by simple, and inexpensive, correction of work processes and procedures. Others may require more extensive changes.

The information in this section will help you to identify the specific hazards on your job and develop ways to fix them.

Traffic

When you're on the highway, those trucks and cars go whizzing past and you can feel the vibrations. You know that there are no second chances. Safety has to be part of you—it has to be in your blood.

—A TDM on the Long Island Expressway

Nothing could be more obvious than the dangers of working in traffic. In a collision between human flesh and blood and a heavy metal motor vehicle traveling at even 20 m.p.h., there is no such thing as a "minor accident." The hostile, careless or impaired driver is much too common. Even the most responsible driver cannot avoid an accident if he or she is not adequately warned and guided about the worksite.

Traffic control is necessary to protect you, the traveling public, and the worksite. Use of the right traffic control devices and principles provides protection, allows you to do your work, and keeps traffic moving smoothly. They will not eliminate the hazards, but they will minimize your exposure.

Traffic Control Must Fit the Driver

Drivers do not expect to share the road with workers and their equipment. Most drivers do not pay close attention to driving. They share their attention with other activities such as listening to the radio, talking with passengers or thinking. Even the alert driver must perform 10 or more driving tasks per second, make 1 to 3 driving decisions per second and take 30 to 120 driving actions per minute!

The unexpected worksite presents a hazard because it confronts the driver with a situation he or she has not prepared for and finds confusing. Worksites also create obstructions and divert the driver's attention from driving.

Many worksite traffic accidents are not really "accidental"—they are predictable. When traffic control is inadequate, drivers will not perform well and someone will get hurt. To be effective, traffic control must:

- Get the driver's attention.
- Warn the driver about the worksite.
- Slow the driver down.
- Guide the driver around the work zone.
- Return the driver to normal traffic flow.

The specific traffic control devices used and their placement will be different for almost every worksite. The traffic control plan must vary with the characteristics of each location such as spread, volume and direction of traffic; time of day; type and duration of work; and the availability and condition of safety devices on the work vehicle. Understanding the available devices and the principles of placement will help you to determine your safety needs and decide whether management is meeting its responsibility to provide traffic control.

The U.S. Department of Transportation, the New York State Department of Transportation—Traffic and Safety Division, and the New York City Department of Traffic all have rules and regulations regarding traffic control devices and their use. These government guidelines, which are listed in the Resource section of this manual, establish the minimum standards for traffic control. Certain situations may call for even more control. This section is based on the government's requirements and, in some instances, suggests the need for stricter control.

Traffic Control Devices and Their Placement and Use

A wide variety of traffic control devices can be used in different combinations to provide maximum protection. These devices include signs, lights, barricades and cones. The use of a backup truck, parked between

approaching traffic and the work area, to supplement the devices may be necessary.

Every traffic control plan must satisfy basic requirements:

Get attention. The devices must be clearly visible and stand out from the roadway and other background.

Be clear. They must convey a simple, easily understood message. It is important to use uniform devices in a consistent manner and to create a traffic flow system that will guide the driver into, around, and past the work zone.

Allow adequate time for response. The devices must be in a sequence that provides time to understand the message and act to avoid danger.

Traffic control plans can use the following devices:

Signs

Types

- Regulatory—Impose legal obligations and must be authorized by whoever has jurisdiction over roadway. For example, ROAD CLOSED and LOCAL TRAFFIC ONLY. Shape, size and color must conform to national, state and city standards.
- Warning—Warn of physical or operating conditions on or adjacent to the roadway. For example, ROAD WORK AHEAD and LANE ENDS MERGE LEFT. They shall have a black legend on a yellow background and should be diamond shaped with a minimum size of 30 inches by 30 inches. They are usually used in advance of the worksite but may be used at the worksite. Unnecessary use should be avoided because it decreases attention-getting and credibility.
- Guide—Give special information for safe and convenient travel

such as directions and route changes. For example, END CONSTRUCTION and DETOUR. These should comply with governmental standards for size, shape and color. Do not lose effectiveness by repeated use.

Sign Supports

- Fixed—When a permanent installation is needed for long-term operations, signs should be mounted on one or two posts depending on the size of the sign.
- Portable—For short-term work,



signs may be mounted on barricades, high-level warning devices or other supports so long as they face the traffic and the bottom of the sign is not less than one foot above the roadway.

Where fast-moving traffic or high winds are likely to move mounts, sand bags or similar ballast may be used on the lowest part of the support. Never use rocks or heavy materials on top of the devices—if struck, a falling weight can hurt you and the driver.

•Mobile—Signs should be mounted on the rear or top of the work vehicles in a manner to insure visibility and which does not impede the vehicle driver's vision.

Placement and Use

•Place signs so drivers will have time to read the message and act before they reach the work area. At lower speeds (15-30 m.p.h.) signs may be placed 30 feet or less from the work area. At 30-40 m.p.h., the first sign drivers see should be about 500 feet before the worksite. Where traffic travels at 45-50 m.p.h., the first sign should be about 1500 feet away and subsequent signs at 500-1000 foot intervals. On 55 m.p.h. expressways and limited access roadways, increase the distance from the first sign to about 1/2 mile from the work area and intervals to between 1000 and 2600 feet. Of course, peculiarities of the work location such as hills, bends, and intersections should also affect sign placement.

•Where more than one sign is used, the first sign that drivers see should be a general sign such as ROAD WORK AHEAD. As drivers get closer to the work zone, signs should give more specific

information.

•Use only signs that are appropriate to the situation. Remove or cover warning and guide signs as soon as work is halted or completed.

•Cover permanent signs if they conflict with the messages on signs in use. If existing signs still apply, make sure you do not block them with temporary signs. Every sign used at night must be reflectorized. Where there is serious interference from light sources so that reflectorized signs are not visible, an illuminated sign shall be used. Lighting may be internal or external. Neither street nor highway lights meet the requirements for sign illumination.

•As a general rule, signs shall be located on the right side of the roadway. On expressways, the near edge of the sign shall be 6-12 feet from the edge of the traveled way or at least 2 feet outside an unmountable curb. On city streets, the distance can be reduced to 2 feet.

•Signs mounted on expressways should be installed so that the bottom edge is about 5 feet above the roadway. On city

streets, this height shall be 7 feet. Where signs are still obscured, it may be necessary to place them on barricades within or on the left of the roadway.

•Damaged, dirty or defaced signs should be repaired, cleaned or replaced.

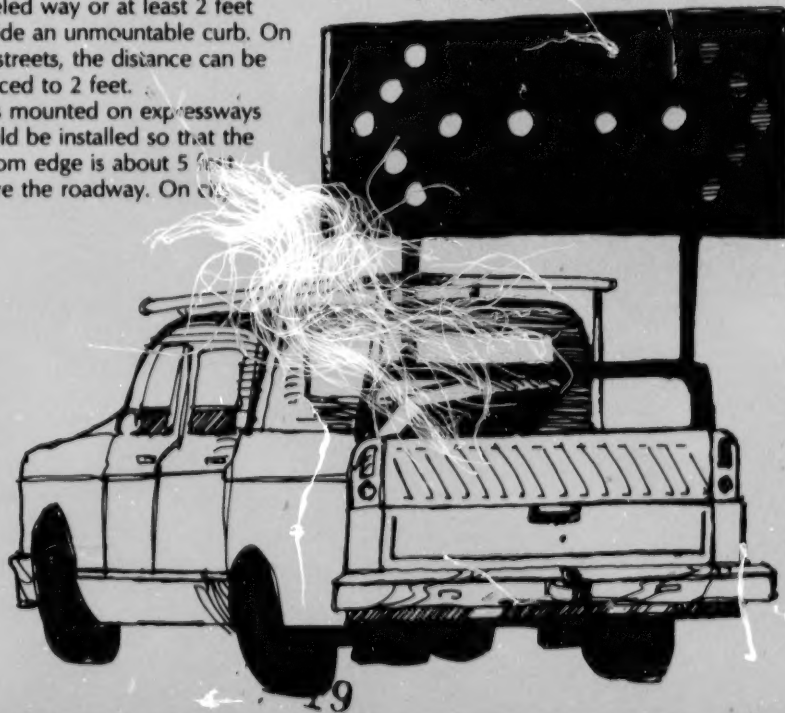
•Flags, which measure a minimum of 18 inches by 18 inches, may be used to draw attention to warning and guide signs.

Advance Warning Arrow Panels

Arrow panels are used with other devices to provide advance warning and to direct traffic around work activities. They are especially useful in high-speed and high-volume situations.

Types

•Variable Message Arrow—Orange reflectorized background at least 4 feet wide and 2 feet high with clearly recognizable black arrow symbol(s). Arrows may indicate a



pass to the right, a pass to the left or pass on either side.

- **Flashing Arrow Board**—A black rectangular background at least 4 feet wide and 2 feet high, with 4 inch diameter (minimum) yellow flashing lights that form a clearly recognizable arrow symbol. Should be changeable to show a flashing left arrow, right arrow, left and right arrow, and caution. On caution four or more lamps are used in a pattern that does not indicate a particular direction to drivers.

Placement and Use

- May be mounted on a vehicle, tool cart or barricade.
- Install so that it faces the on-coming traffic and the bottom of the sign is at least 4 feet above the roadway.
- May be used only in conjunction with the other warning devices.

Warning Lights—Flashing

Flashing lights are used to warn drivers of potentially dangerous areas. They cannot be used to guide traffic through a work area. Multiple flashing lights only serve to distract and confuse drivers when used as delineators and are contrary to federal regulation.

Types

- **Advance Warning Flasher**—High intensity 7" (minimum) warning lights provide a flashing yellow light in one direction only. Shall be used day or night.
- **Close-in Warning Flasher**—High intensity 4" barrel type AC flashers (two directional) or 4" battery flashers (one directional) used to supplement advance warning flasher.

Placement and Use

- The advance warning flasher should be mounted about 11 feet

above the roadway. Close-in warning flashers should be mounted at 8 feet above the roadway.

- At night and in periods of poor visibility; advance warning flashing lights should be mounted at a height of at least 36 inches but not more than 48 inches above the roadway. They should be spaced at 25 foot intervals.
- Mounting depends on the use of the devices. They may be mounted on barricades, posts, a base, or a vehicle.

Steady Burning Lights

Steady burning lights may be used for delineation and to guide traffic through lane changes, detours, lane closures and other areas that may be confusing. They may be powered by batteries or from a generator or may be lanterns of the enclosed type. Open flames, such as a pot torch, may not be used. Steady burning lights may be mounted on barricades or other devices. Drivers must be able to see and follow the path created by the lights quickly and easily.

High Level Warning Devices

High level warning devices are particularly useful for short term operations in high-volume, low-speed situations. They are tall, light-weight frames that hold flags, signs or lights above passing vehicles to provide early warning. The flags, lights or signs should be mounted so that the lowest point is at least 8 feet above the roadway.

Barricades

Barricades are portable devices used to protect open trenches and obstacles, to close lanes and roads temporarily and to channel traffic.

Types

- **Type I**—Used for temporary or short duration jobs and for outlining excavations. Has one 6 or 8 inch by 2 inch cross-rail not more than 10 feet in length with the upper edges of the rail 3 feet above the roadway.
- **Type III**—Used for major jobs when the barricade will remain in the roadway for extended periods. Has three 6 or 8 inch by



2 inch crossrails not more than 8 feet in length about 20 inches apart with the upper edge of the top rail about 5 feet above the roadway.

Placement and Use

- All barricades must have alternating 6 inch wide orange and white stripes sloping at an angle of 45 degrees.
- When barricades are used to guide traffic, all of the stripes should slant down toward the direction traffic is to pass. Where traffic may pass on either side, the stripes should slope out from the center downward in both directions.
- Barricades must be reflectorized if used at night. For increased visibility of a single barricade used at night, they should be equipped with flashing lights. If barricades are used in a series, they should be equipped with steady burning lights.
- When barricades are used to block off a portion of the street, they must be placed end to end no farther than 5 feet apart. Traffic cones shall be used to divert traffic past or around the barricades. The first cones must precede the barricades by 100 feet on city streets, where possible, and 350 feet on high speed highways.

Vertical Panels

Verticle panels may be substituted for barricades when there is a minimum of space to warn and direct traffic. They must be 12 to 18 inches wide and a minimum of 24 inches high. Like barricades, vertical panels should have alternating orange and white stripes that slope downward in the direction that traffic is to pass. If used

at night, they should be mounted with lights.

Drums

Drums may be used to guide and direct traffic for long-term operations where a highly visible and formidable obstacle is desired. They must be 36 inches high with an 18 inch diameter and be marked with horizontal alternating orange and white reflectorized bands that are 4 to 8 inches wide. Drums constitute a danger to drivers and must be marked with advance warning signs and lights. Never weight drums with materials that make them a hazard to drivers. They should have drain holes to prevent filling with water.

Traffic Cones

Cones are used to guide and direct traffic around or through the work area during daylight hours. They are well suited to short-term or mobile jobs, because they can be stacked and moved easily. At least one advance warning sign must be used to explain the cones. Flags inserted in the top of the cone increase its visibility. Cones must be reflectorized or lighted if used at night.

Cones shall be predominantly orange and may have a white reflectorized band of 4 inches (minimum) near the top. Cones must be at least 18 inches high and may be 36 inches high. The taller the cone, the more visible it will be. Tall cones are especially suited to high-speed and urban roads.

Cones are light and easily blown over. They may be double stacked to make them heavier. Some cones are made with heavy bases or are designed to hold water or sand in their bases. While this increases stability, it makes them heavier to move.

If cones are removed at the end of

each day and replaced in the same place the next day, try spotting the location of every third cone with white paint. You will save time.

Stanchions and Barrier Tape

Stanchions are yellow pipes and bases to which orange barrier tape is attached. Together they create an effective outline for street work areas where barricades are unnecessary or impractical.

Flagging

Flaggers will be required where traffic must be stopped or controlled, such as when two directions of traffic must share the same lane or traffic must be stopped to allow workers or equipment to cross the road. There must be a flagman for each direction of traffic affected.

Flaggers must be visible, at all times, to approaching traffic for enough distance to catch the driver's attention, and make him or her slow down and follow the signals. Flaggers shall wear an orange reflectorized vest and carry red 24 inch by 24 inch (minimum) flags which are securely fastened to a staff about 3 feet long. Wearing orange clothing will increase visibility.

Flaggers should face traffic and make eye contact with drivers as they approach. If a driver ignores the flagger, he or she should warn the crew and get out of the way fast.

Vests and Clothing

Orange reflectorized vests assist the driver in spotting and avoiding the individual workers. A clearly visible hardhat also is helpful. Orange, red, yellow or other brightly colored clothing provides additional protection.

Backup Vehicles

Backup trucks and work vehicles can provide an effective barrier to protect workers from motor vehicles in

the work zone. Wherever possible, park vehicles so that they are between approaching traffic and the work area. Be sure to allow enough space between the vehicle and the closest workers to prevent it from being pushed into them if it is hit. Proper choking of the vehicle will also

minimize the chance of it moving into a worker.

Backup vehicles can also serve as warning devices. They may be mounted with signs, arrows, lights or painted with orange and white verticle stripes. On mobile operations in high volume or high speed locations,

backup vehicles should follow the work vehicle to provide extra warning and protection.

The Traffic Control Plan

Evaluating the Traffic Control Plan

Before you leave the shop to start work, be sure that the traffic control



plan will warn and guide drivers in a way that will protect you and your co-workers. To be effective, the traffic control plan should:

- Schedule work on busy highways or streets during off-peak hours.
- Provide clearly defined boundaries of work areas.
- Establish a traffic control system suited to the job and location you will be on. Variables include:
 - type of work (mobile, stationary)
 - speed and expected volume of traffic
 - type of roadway
 - location of work in relation to roadway
 - whether an intersection is involved
 - time of day
 - weather conditions
 - duration of the job
- Provide for delivery of all of the necessary devices to the worksite.
- Allow sufficient time and personnel for installation of devices.
- Specific placement of backup trucks and other work vehicles that will maximize their use as additional protection.

Closing Off Traffic Lanes

When traffic hazard elimination requires that one or more lanes be closed to traffic while work is in progress, it is important to use traffic control devices to provide a smooth transition of traffic from one lane to another. Cones, barricades and/or drums are used to ease the driver onto a path from one lane to another. Proper planning and implementation is critical to your protection.

The Plan

A safe plan for traffic channelization does the following:

Closes on the worklane for a safe distance. The lane should begin to be closed sufficiently in advance of the work zone to allow drivers to move gradually from the work lane to a new lane or lanes. If the length is too short, the driver will not have enough time to react and switch lanes. The rule of thumb is that the distance from the first device to the beginning of the worksite is equal to the width of the work area multiplied by the traffic speed. This length should be increased if there are sight obstructions, interchange ramps, dips, hills, or curves in the roadway.

Places devices close enough together. The maximum space between cones and other devices is equal to the posted speed limit. For example, if the posted speed limit is 20 mph, devices cannot be spaced further apart than 20 feet. Closer spacing is always desirable.

Places devices at the proper angle. The device farthest from the work zone should be placed at the farthest edge of the lane to be closed. Place the next device one foot further into the lane to be closed and move it toward the work zone the same number of feet as the posted speed. Continue this procedure until the width of the work zone has been achieved.

Gives the most open lanes to the direction of the heaviest traffic flow.

Tries to keep traffic moving on paved surfaces.

Installation

To maximize safety during installation:

- Install devices *before* work begins.
- Follow the proper order for installation:
 1. Advance warning signs (opposing lane first)
 2. Flaggers (who remain until all devices are installed)
 3. Lane closing devices

4. Devices around the work zone
 5. "End construction sign" beyond the project
 6. Move workers and equipment onto road (use warning lights on vehicles).
- If placing devices for two directions of traffic, begin by installing signs and devices in the opposing lane of traffic.
 - If a major intersection is located between the first sign and the worksite, it may be helpful to install a duplicate sign just beyond the intersection.

Maintenance

Maintenance is necessary to be sure the traffic control system functions properly:

- If devices are not delivered to the worksite, demand them.
- Make sure all devices are clean and legible.
- Have damaged devices repaired or replaced.
- Make sure that devices are not blocked by vehicles, equipment or other obstructions.
- Make sure that the devices are adequately warning and guiding drivers so that they stay out of the work zone. If not, change them.
- If traffic volume, speed or direction changes during the work day, adjust the system to meet new requirements.

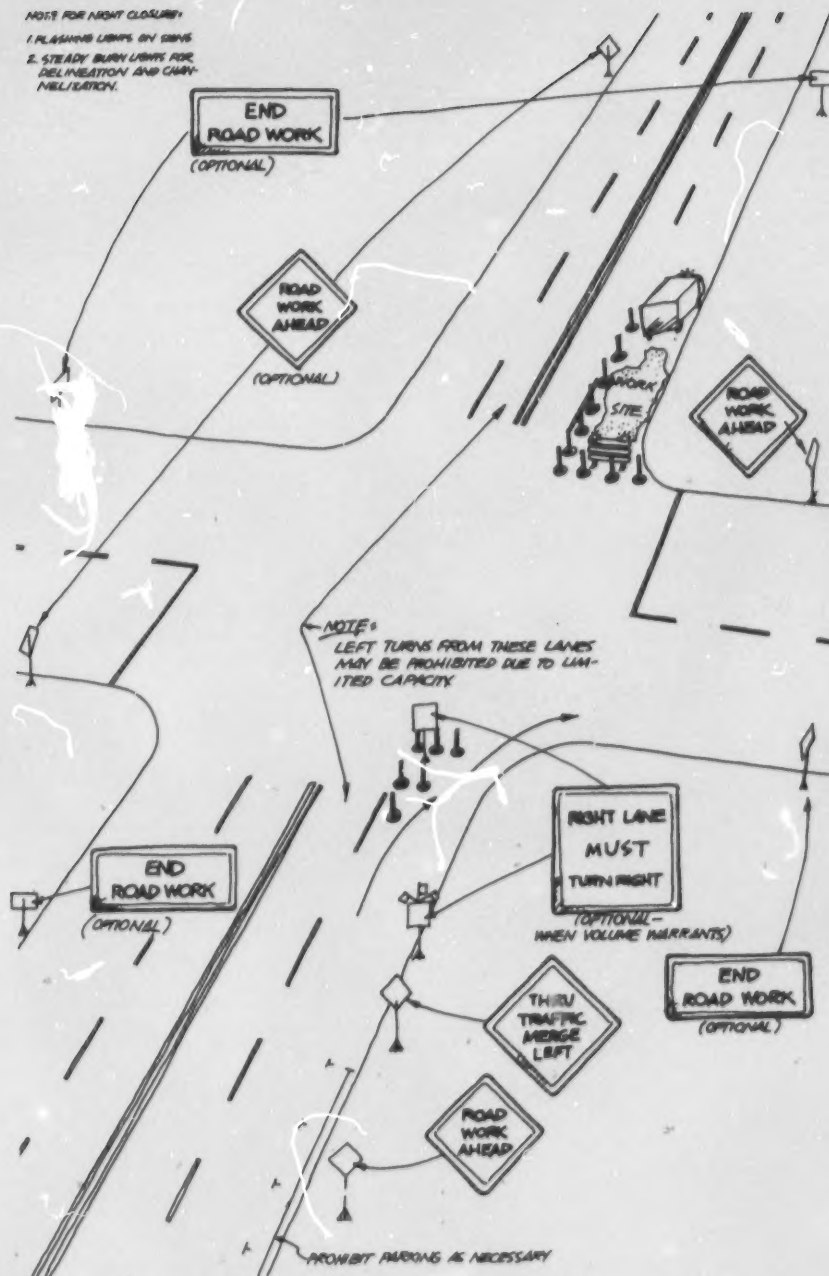
Removal

- First, remove work vehicles and equipment from the roadway.
- Remove all devices in the reverse order in which they were installed.
- Restore the area to regular traffic control.
- Check to make sure no devices have been left behind.

Sample Traffic Control Plans

It is impossible to provide a traffic control plan for every work site on which road crews work. We have provided examples of some typical work locations throughout this section. More samples are available in the manuals listed in the Resource section of this guide. Remember, these show *minimum* set-ups and you may want to increase traffic controls to meet the needs of your worksite.

NOTES FOR NIGHT CLOSURE:
1. FLASHING LIGHTS ON SIGNS
2. STEADY BURN LIGHTS FOR DELINEATION AND CHANNELIZATION.

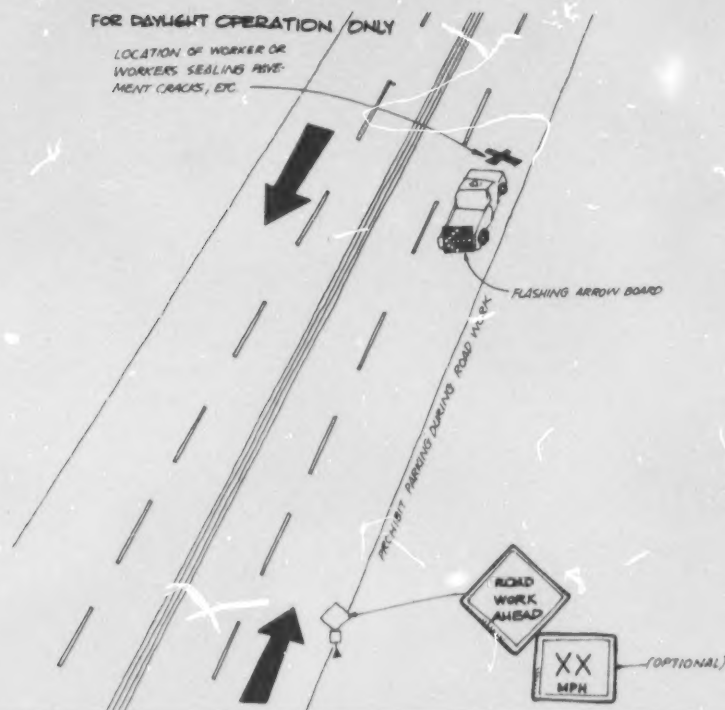


Closure at an Intersection

Work at an intersection is especially dangerous because traffic is moving in many directions. It may be necessary to prohibit turns in high volume situations. Placement of backup trucks and work vehicles helps to close the lane and provide warning to drivers. Flashing lights, high level devices, and signs should be used in sufficient quantity for each direction of traffic affected by the work area.

Lane Closure for Mobile Operations

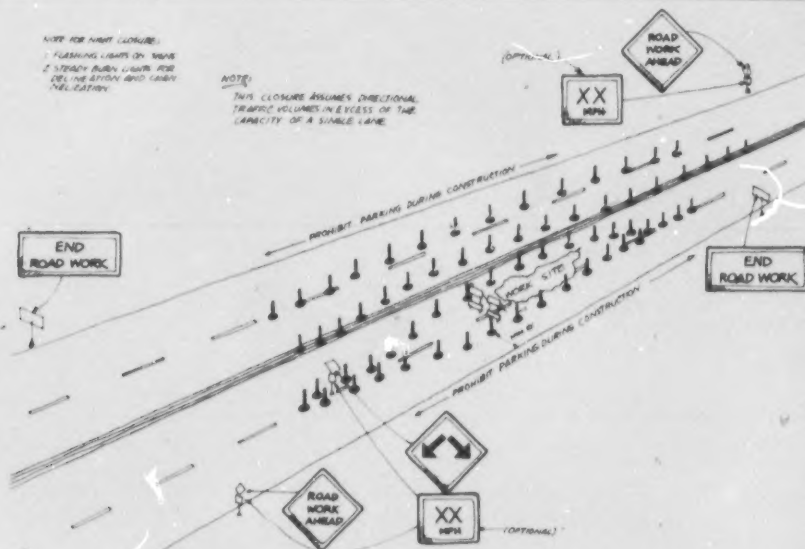
Use of stationary traffic control devices is impractical for mobile operations such as pothole repair, street cleaning and night-lining. The work vehicle itself must be equipped with lights, arrows and signs to warn and guide traffic and to protect workers. When working in high speed or high volume traffic, backup trucks should be used for additional protection.



NOTE FOR NIGHT CLOSURE:
1. FLASHING LIGHTS ON TRUCK
2. STEADY BURN LIGHTS FOR
TOLLING ATTENTION AND LIGHT
PULSATION

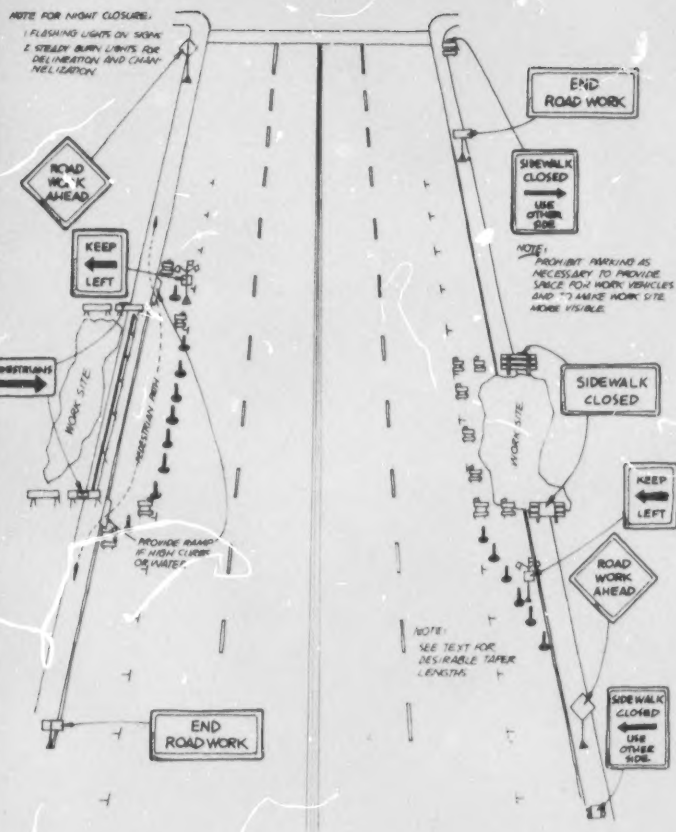
NOTE:

THIS CLOSURE ASSUMES DIRECTIONAL
TRAFFIC VOLUMES IN EXCESS OF THE
CAPACITY OF A SINGLE LANE



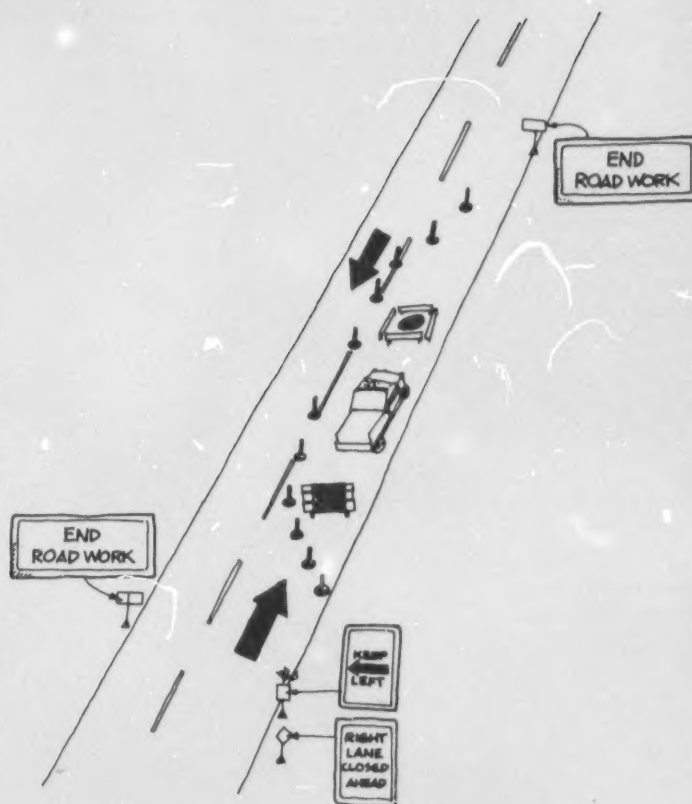
Closure of High Volume Traffic Splitting Two Lanes of Traffic

On arterials or large heavily traveled streets, it may be necessary to split lanes of traffic in order to keep it flowing smoothly. Devices must clearly warn and guide drivers around the work area. If traffic moves rapidly, it may be necessary to use barricades and backup vehicles to protect workers.



Work Area on Sidewalk and Curb Lane

Work on or next to a sidewalk or curb usually does not involve interference with traffic. One warning sign is generally sufficient. Barricades or cones should be used to separate the work area and equipment from traffic and pedestrians. Where work entails ladders, open holes or other hazards from and to pedestrians, make sure the work zone is clearly marked and separated. Use of special devices such as manhole guardrails and planking may be necessary. Vehicles, if any, should be equipped with flashing lights, flags and signs.



Closing One Lane of a 2-Lane 2-Way Street at Mid-Block

Work on a city street usually involves working in low-speed traffic. This sample is for medium volume traffic. If there is high volume, you may want to add more warning devices in advance of the work area. If there is low volume, the flaggers may not be necessary. If the work area is short and speed and volume is low, one flagger may be sufficient. Work vehicle(s) should have a dome light visible to both directions of traffic in both day and night time. Warning signs or arrows should also be mounted on the back of work vehicle(s).

Vehicles, Equipment and Tools

There should be time to check out the truck and equipment before we go out. By the time we know it's bad, it's too late. We have an unsafe condition, an unsafe condition on the road.

*—An MVO working with
HRs in the Bronx*

You depend on your work vehicles, equipment and tools to get your job done. You also depend upon them for your own health and safety. Old, poorly maintained, missing or inappropriate vehicles, equipment and tools can cause injuries and even death. Highway Repairers, Traffic Device Maintainers, and Motor Vehicle Operators have the right, and the responsibility, to demand the vehicles, equipment and tools that are necessary to work safely.

Vehicles

It does not require safety expertise to know that defective motor vehicles can be hazardous. Just fixing broken parts cannot eliminate your exposure to danger. A regular program of inspection and maintenance of work vehicles is the only way to guard against unnecessary accidents. And vehicles that are beyond repair should be put out of service—not on the road.

Minimum Operation Standards List

The New York State Vehicle and Traffic Law, and the Commissioner's Regulations issued to implement the Law, require that every motor vehicle operated or driven upon the public highways of the state be in good working order. These specifications furnish the minimum standards for a safe work vehicle. Before starting work, be sure that your assigned vehicle meets the minimum standards. If it does not, it is unlawful to drive it on the public highways and you have the right, and the duty, to refuse to break the law and endanger yourself, your co-workers and the public.

The law provides that every motor vehicle operated or driven upon the public highways of the state shall have, at a minimum:

Steering mechanism in good



working order and sufficient to control the vehicle at all times.

Brakes capable of reducing the vehicle's speed quickly enough to bring it to a stop from the speed of 20 m.p.h. on hard, dry, level pavement within 30 feet (where brakes can be applied to every wheel) or 45 feet (where they cannot be).

Hand brakes capable of holding the vehicle still on any grade.

Windshield wipers or devices which shall clear a sufficient area of the windshields to provide reasonable driving vision.

Two front head lights and two rear tail lights. Headlights shall be white or yellow. Tail lights shall display a red light visible for at least 500 feet. (Required only on vehicles driven between one-half hour after sunset and one-half hour before sunrise and when visibility for a distance of 1000 feet ahead is not clear.)

Mirror or other reflecting device that provides a clear and full view of the road and condition of traffic behind the vehicle.

Side view mirror attached to the left outside of the vehicle and adjustable so that the driver may have a clear view of the road and condition of traffic on the left side and to the rear of the vehicle.

Safety glass used wherever glass is used in doors, windows and windshields.

Emergency lighting equipment that is ready at all times for immediate use.

Directional signals that are maintained at all times in good working order. In addition, a device that can cause the two front and two rear directional signals to flash simultaneously for the purpose of warning the operators of other vehicles. Front lights shall be white to amber. Rear lights shall be red. (Does

not apply to road roller, power shovel, road building machine, snow plow, road sweeper, sand spreader or earth mover in excess of 8 feet in width.)

Stop lamps which display a red to amber light visible at least 500 feet from the rear of the vehicle when the brake is applied.

Handles or other devices which shall permit the door, or doors to be readily opened from the vehicle's interior.

Mud flaps that reasonably bar water or other road surface substances from being thrown by the rearmost wheels behind the vehicle and that minimize side spray.

Clearance lamps on the left and right side of the front and rear of the vehicle. Shall be amber on the front and red in the back. If more than 30 feet in length, shall be supplemented by amber side-marker lamps and reflectors to be mounted at the top of the body of the vehicle.

A red flag, at least 24 inches, shall be mounted on each vehicle that has a crane, boom or similar device or is loaded with any material that extends 4 feet or more beyond its front or rear. At night, a red light visible from the rear and an amber light visible from the front shall also be provided.

Mufflers and exhaust system in constant operation and properly maintained to prevent excessive noise and carbon monoxide poisoning.

Tires must not have a fabric break or a cut in excess of 1 inch in any direction; a blowout patch; any bump, bulge or knot related to separation or partial failure of the tire structure; any portion of the ply or cord structure exposed; a portion of the tread design completely worn so as to affect traction and stopping ability; wear to the point where less than 2/32 of an inch tread groove pattern depth

remains (on trucks with a maximum gross weight of 10,000 pounds or truck-tractors the minimum tread groove pattern depth shall be 4/32 of an inch.)

Safety belts.

Some Special Needs

Remember, these minimum standards are intended for all motor vehicles driven on public highways. You use your vehicle for working on streets and highways for long hours every day. Therefore, you have special needs and your vehicles should meet them. These include, but are not limited to:

- A cab design that will provide a quiet, well-ventilated and temperature-controlled environment with a minimum of vibration.
- Runningboards, handholds, steps and other devices that help you get in and out and on and off the truck safely.
- Body design that lets you load and unload equipment, tools and substances safely, quickly and easily.
- Special safety features for vehicles such as snow plows and tractors.
- Special safety features for the storage and transport of explosive, flammable or hazardous substances.

Equipment

The equipment used by Highway Repairers and Traffic Device Maintainers is varied because each job requires specially adapted equipment. Therefore, it is impossible for this section to discuss every piece of equipment that you use. You probably already have a good idea of changes that need to be made to improve the performance and safety features of the equipment on your job. This section

will discuss general principles and some of the most common equipment as examples of how to evaluate the equipment that you use.

Machine Hazards

Most accidents with machinery are blamed on "human error"—or the careless, rushed or ignorant worker. Sometimes, the operator is at fault. However, machine design that does not provide adequate protection usually also is at fault. Machines have moving parts, such as sharp edges, gears, chains and revolving shafts that can cut, crush or throw objects at you.

The specific measures required to eliminate and control machine hazards will vary with the specific dangers posed. (For example, hydraulic systems contain fluid under very high pressure. If the pressure is released accidentally, rapid changes in the positions of machine parts and equipment can cause serious injuries. Moreover, even pinhole leaks can produce jet streams that penetrate your flesh.) Some of the measures that can be taken are:

- Operating controls that are easy to reach and use to shut off or reverse machine parts. Two-handed operating controls force you to use both hands at once and may reduce hazards.
- Guards on all equipment that will separate you from hazardous parts and thrown objects.
- Bright paint on all hazardous parts that will catch your attention.
- Tag-out or lock-out procedures for machines being repaired to make

sure that they are not operated.

- Safety glasses when there is a risk of flying objects.
- Safety shoes and hardhats when there is a risk of falling objects.
- Clothing that is not loose or floppy.
- Training in the potential hazards of the machines you use.
- Never working too far away from a co-worker who can hear you shout for help and see that you are in trouble.

Electrical Hazards

Working with defective electrically powered equipment and tools that can cause burns and shock and may be fatal. Shorted, broken or exposed wires inside a machine or other defects in the electrical circuits will energize its metal framework. Unless the machine is properly grounded or insulated, your contact may make you a path for electrical current.

High voltage is not required to produce a serious burn or shock. A machine using as little as 100 volts can produce a current that can cause loss of muscular control or death. Common portable electrical equipment uses between 50 and 240 volts.

The current that passes through your body is determined by the voltage applied to your body and the

contact. Obviously, increasing the resistance will reduce the dangerous effects of electrical hazards. This can be accomplished in several ways:

Insulate the conductor.

Nonconductive material, such as plastic, around the current source eliminates contact between the current and your body. Insulation should be inspected and maintained regularly. Even small leaks can be extremely dangerous. Double insulation may be used as additional protection on the live parts of a tool. Insulation does *not* provide protection against defective plugs and cords or heavy moisture conditions.

Grounding. A separate low resistance ground wire attached to the framework of the equipment and connected to a good ground, such as water pipes or other metal structures in direct contact with low resistance soil, channels the flow of current away from your body. Where no metal structures are available, rods of iron, steel or nonferrous metals can be driven into the ground to a depth of at least 8 feet. (Grounding must comply with the *National Electric Code*.) Grounding wires easily can become detached and may not be detected. Check with meters or test lamps frequently to reduce surprises.

Ground-fault circuit interrupter. This is a fast acting circuit breaker which senses small imbalances in the circuit caused by current leakage to ground and, in a fraction of a second, cuts off the electricity. It provides protection against ground fault, and eliminates fuses, overheating and destruction of insulation of wiring. It does not protect against line-to-line contact hazards. OSHA strongly encourages the use of Ground Fault Circuit Interrupters.

Regular inspection and maintenance. All flexible cords, terminals, plugs and other machine

parts subject to breaks and leaks should be inspected regularly.

Avoid working with electrical equipment when you are wet or when the equipment is wet. Water is a good conductor and decreases the resistance of your skin to electrical equipment. If you must work in wet conditions, take extra precautions with insulation and grounding. Wearing rubber or plastic protective clothing such as gloves and shoesoles may help.

Climbing Hazards

Use of a wrong or defective ladder can result in a dangerous fall or electrical shock. Some simple precautions can reduce the hazards of ladders:

- Metal and wet wooden ladders conduct electricity and should never be used when using electrically powered equipment.
- Ladders should be equipped with non-skid feet or spurs.
- Spreader hardware should be regularly inspected and repaired to eliminate cracked, broken, or faulty parts.
- Metal ladders should be regularly inspected and maintained to eliminate rough burrs, sharp edges, loose joints or bolts, insecure welds and cracks.
- Wood ladders should be regularly inspected to eliminate cracks, rot, shakes, splinters, broken rails or rungs, loose joints and bolts.
- Wood ladders should be finished with a clear sealer, or wood preservative. They should not be painted because paint can hide defects or cause slips.
- Metal ladders should be stored indoors.
- Wood ladders should be stored in a well-ventilated area away from dampness or heat.
- Rungs and steps should be kept

free of grease, oil, paint, snow, ice, mud or other slippery substances. Keep a rag tied to the side of the ladder for quick wipe-ups.

- Ladders in need of repair should be red-tagged until fixed. Ladders beyond repair should be replaced.

Weight Hazards

Back problems are among those most frequently reported by Highway Repairers and Traffic Device Maintainers. You frequently lift and carry heavy or bulky objects. Incorrect lifting and carrying methods or carrying too heavy a load increases the likelihood of back injury. Weight hazards can be reduced if you:

- Test the weight of an object before attempting to lift and carry it. If it is too heavy, get help. Use mechanical lifting devices whenever possible.
- Lift correctly:
 - Keep your back straight.
 - Bend from your knees and not your waist.
 - Take the weight with your knees, then your hips.
 - Straighten slowly.
 - Never shift the weight onto your back.
- Make sure your hands are not greasy or slippery and footing is firm.
- Before lifting, be familiar with the carrying route and, if necessary, clear it of tripping hazards, projections or other obstructions.

Tools

It is easy to overlook the dangers of handtools because they are small and commonplace. But, anyone who has ever fallen from a ladder because a wrench did not provide proper leverage, or gotten a rash because chemicals penetrated knuckles skinned

from using too small a tool understands potential hazards.

The tools used by HRs, TDMs, and MVOs are too varied to be covered fully. A tool that is safe for one job may be dangerous for another. You and your health and safety committeemen are the best judges because you have the on-the-job expertise to identify hazards and develop solutions. In deciding whether you have the best tools for your job, some questions to ask are:

- Do I have all the tools I need to do my job?
 - Am I using the right weight tool for the work to be done or do I have to strain?
 - Are tools used with or near electrical circuits non-metallic or suitably insulated? Are they tested frequently to make sure the insulation is intact?
 - Are handles securely wedged tightly in the heads of all tools?
 - Are they free from rough or jagged surfaces? Are they long enough?
 - Do wrenches fit the nut or bolt head tightly? Do they provide sufficient leverage or do I have to use extra force, a hammer or other device to compensate? Are they the proper shape and long enough to work in recesses? To work around hot machines? Are they in alignment?
 - Are moving or adjustable parts clean and lubricated?
 - Are sharp or pointed tools well ground?
 - Are tools stored in suitable boxes, racks or trays?
 - Are tools damaged beyond safe repair replaced by management?
- If any questions can be answered "No," your tools may be dangerous to your safety.

Fire

We have no fire extinguishers and refueling a hot machine causes fires pretty often. What are we supposed to do? Spit on it?

—An MVO on Staten Island

Work with and around hot vehicles, electrically powered equipment, and flammable and combustible materials such as fuels, coal tar, paints and solvents, makes fire a constant threat to HRs, TDMs, and MVOs. You can be burned, asphyxiated, or poisoned by toxic fumes created by fire-induced chemical reactions. Most fires are unnecessary. Using the proper process and materials, you can prevent and control fires.

Fire requires an **ignition source**, a **fuel supply** and **oxygen**. Removal of any of the three will prevent or stop the fire. To reduce the danger of fire on your job, you and your health and safety committee should:

- Identify the specific ignition sources and have them removed or confined.
- Identify the specific fuel supplies and have them removed or guarded.
- Be sure proper fire control equipment is adequate and operates properly.
- Be sure fire prevention and control procedures are in effect.

The information in this section will help you identify fire hazards and develop your fire prevention and control plan.

Ignition Sources

Open flames. Cigarette lighters and matches are a major cause of fires. Smoking should be restricted to safe areas. Where open flames are part of the work process, other procedures should be substituted whenever possible. Open flames should be confined and tended carefully to prevent unnecessary spreading.

Hot surfaces. Vehicles and equipment that become hot through use should be isolated from flammable

and combustible substances whenever possible. Never refuel a vehicle or machine while it is still running. Always have fire extinguishers within reach when refueling.

Hot particles and embers. Work processes such as welding and grinding that produce hot particles and embers should be done away from flammable and combustible substances.

Sparks from electrical equipment. Electrical equipment should be properly insulated and grounded. Whenever possible, use electrical tools far from hazardous substances.

Sparks from static electricity from pouring liquids. Pouring a liquid from one metal container to another can create sparks that may ignite the liquids. Metal containers should be bonded together or grounded to the earth before liquids are transferred.

Fuel Supplies

The fuels, solvents, paints, adhesives and other substances you work with may be fuel supplies for a worksite fire. You should learn as much as you can about each of them.

Flammable liquids are liquids whose vapors will burn at temperatures below 100° F. Many flammable liquids may be found on your jobsite. These include gasoline, lacquer thinner, toluene and turpentine. The law requires that special labels be used to identify flammable liquids. They may be labeled as Class I A, I B or I C, or numbered as 3 or 4 in the red block of the National Fire Protection Association's diamond shaped hazard identification diagram, or marked as flammable on a U.S. Department of Transportation label.

Combustible liquids are liquids whose vapors burn when heated above 100° F. Combustible liquids commonly

found on your jobsite include fuel oil, kerosene, creosote oil, mineral spirits, safety solvent, and hydraulic fluid. The law requires special labeling of combustible liquids. They may be marked as Class II, IIIA or IIIB, numbered as 1 or 2 in the NFPA's red block, or as combustible on a D.O.T. label.

Anything that will burn, such as wood, cloth, paper and other construction materials can be a fire hazard and should be kept from ignition sources.

Fire prevention and control plans should:

- Substitute non-combustible substances for flammable and combustible substances, or at least, combustible substances for flammable substances wherever possible.
- Isolate flammable and combustible substances from ignition sources by storage in closed metal containers away from sources of sparks or heat, including the sun.
- Provide covered metal containers for depositing rags or other wastes soaked with fuels, solvents, paints or other flammable and combustible liquids.
- Provide for red painted fire pails containing sand to be hung on shop walls.

Fire Control Equipment

There are four types of fire extinguishers for four types of fires. **Be sure the fire extinguisher you have on your jobsite is the one you need.** Having the wrong fire extinguisher is like having none at all. Check the label on the fire extinguishers on your worksite against the potential fire

hazards and be sure that they are adequate.

Fire extinguishers are labeled to indicate the classes for which they may be used:

- Class A—Used on fires involving wood, paper and cloth. Emits water to lower the temperature of the burning material.
- Class B—Used to smother fires fueled by flammable or combustible liquids. Emits carbon dioxide, dry chemical or foam which separates oxygen from the vapors.
- Class C—Used to extinguish electrical fires by emitting carbon dioxide or other nonconductive materials.
- Class D—Used on burning metals where water can cause a violent explosion.

Some fire extinguishers bear labels that indicate that they can be used for more than one class.

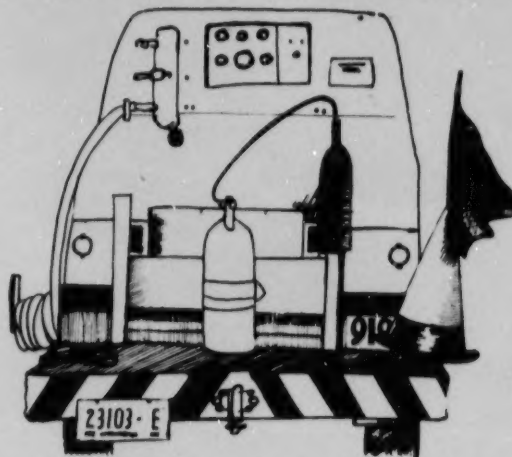
Fire extinguishers should be plentiful and within easy reach.

Fire extinguishers must be inspected regularly to make sure that they are fully charged and operable. In winter, they should contain antifreeze.

Every worker should be trained in the proper use of fire extinguishers. The size of a fire is determined in the first few minutes:

- Always stand with the wind at your back. Be careful of shifting winds, and change position if necessary.
- Start 8 feet from the fire.
- Class A extinguishers should be aimed at the base of the fire and moved forward.
- Carbon dioxide extinguishers should be used to sweep the flame off the burning surface by starting at the near edge and progressing forward by slowly moving the cone from side-to-side.
- Dry chemical extinguishers are also used in a sweeping motion but the cone is moved rapidly.
- If two or more extinguishers are used, work as a team on the same side of the fire.

If a fire gets out of control, especially if paints and gasoline are about, PULL THE ALARM AND GET AWAY FROM THE AREA. If you are on the highway, use the emergency police phone to call in the alarm.





Common Health Hazards

Highway Repairers, Traffic Device Maintainers and Motor Vehicle Operators confront serious health hazards on almost every job. The materials you use, the noise that surrounds you, the weather you work in and the constant stress of your work can all make you ill. The information in this section will help you recognize the health hazards on your job and work with your health and safety committee to change the materials and processes that cause them.

You do not have to be a doctor, chemical engineer, industrial hygienist or other specially trained expert to understand this section. It is based on your work and you know your job better than anyone else. However, you may need technical assistance to identify and resolve specific problems. The District Council 37 OSHA Project and other Council resources are available to help you and your health and safety committees.

Hazardous Substances

We all dipped our hands in that solvent. We could feel our hands get ice cold as it took the heat away from our fingers. After a while, it chapped our hands raw. So we don't dip them all the way in. But we still have to put our fingers in that stuff.

—A TDM using paints

You probably have learned a lot about hazardous chemicals you work with, the hard way—through the problems they cause you and your co-workers. Unfortunately, occupational health experts have learned about them the same way. Each year, about 3,000 new chemicals are introduced into industry. Their effects on the workers who will use them are never tested. Most conclusions are drawn from experience—not based on experiments. However, you can use what is known to protect yourself and your co-workers from unnecessary chemically caused diseases.

How Chemicals Enter and Affect Your Body

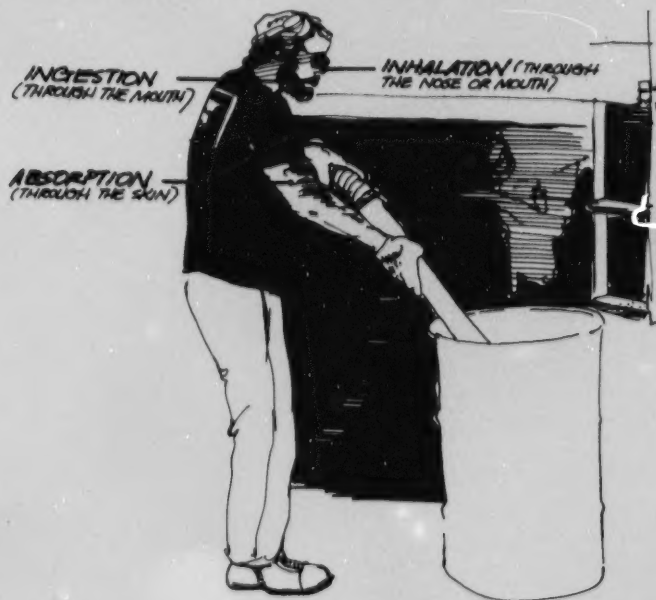
Your body has a well-developed defense system that protects you against invasion from many foreign substances. The defense system includes the lining of your respiratory

system (nose, air tubes, lungs), your skin, and the lining of your digestive tract (mouth, food tubes, stomach and intestines). However, the system is not foolproof and hazardous substances can pass its barriers and enter your body.

The way a substance enters the body affects the damage it can do and the measures that must be used to control it. There are three routes of entry. These are:

Inhalation. You can breathe in gases, liquids in their vapor state, and tiny solids such as dusts and fumes. Once inhaled, they can irritate your nose and respiratory tract, including your lungs, and pass from your lungs into your bloodstream and reach other parts of your body. Only the finest dusts and fumes can be inhaled; many of the most dangerous particles cannot be seen with the naked eye.

Skin contact. Only a small number of substances enter through the skin in



hazardous amounts. Entry is faster through skin that is cracked or inflamed. Sweat-soaked or hot skin is a less effective barrier. Solvents and degreasers that work by breaking down fats can also break down the fats in your skin and destroy its protective mechanism. Chemicals may penetrate the skin, enter the blood stream and travel throughout your body. Those that do not penetrate may still cause serious skin problems and some chemicals can both penetrate and irritate.

Ingestion. Eating or smoking with contaminated hands or in a contaminated place can feed hazardous chemicals to your system. You can also swallow dust that is caught in the mucous of the nose and throat. Those that are not destroyed by the digestive system can travel throughout your body. It is a major problem primarily for highly toxic substances such as lead.

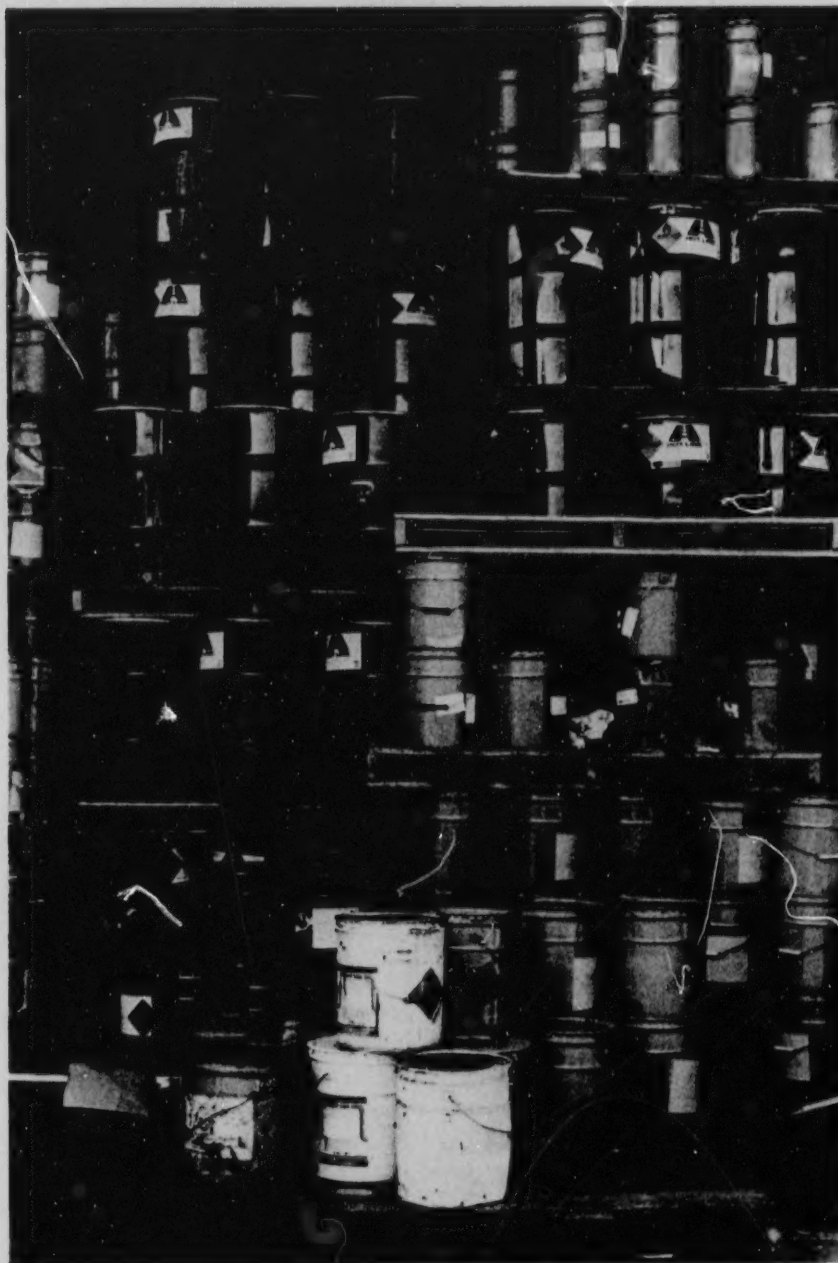
Hazardous chemicals can affect every part of your body. There is a broad variety of types of severities of possible reactions. These may be described as:

Acute. Developing quickly and usually of short duration, acute effects are readily seen and easily connected to the cause.

Chronic. Chronic reactions take a long time to develop and may require prolonged exposure. Sometimes, the disease appears long after the last exposure. May be difficult to identify the cause; or it may be too late.

Local. Symptoms develop where the substance enters or contacts the body.

Systemic. Effects of these chemicals are not limited to the point of entry or contact and may involve more than one part of the body. You may not realize they are related to a substance



on your job.

Sensitization. Some people react (are allergic) to a substance while others do not. Or, initial exposure may not cause a reaction but later contact with the same or similar substance may make you sick.

A Word About Exposure Levels

The hazardous effect of a substance depends on its ability to injure your body (toxicity), how it enters and reacts with your body, how rapidly it acts, and its warning properties. For example, a highly toxic chemical is not very hazardous if you are forewarned and can prevent it from entering your body. Similarly, a substance sometimes is less dangerous if you recognize its symptoms in time and get treatment quickly.

Reducing your exposure to hazardous substances can eliminate or reduce the chances of disease. There are several guides for determining minimum standards for a healthy workplace.

OSHA has established or adopted standards for allowable exposures for a few hundred of the toxic chemicals currently used. This is the substance's Threshold Limit Value (TLV)—the maximum average concentration to which a worker can be exposed for 8 hours per day. This value usually can be exceeded at some times of the day so long as the average daily exposure does not exceed the limit. Some especially hazardous chemicals also have a Ceiling Value (TLV-C) which is the concentration that should not be exceeded even for an instant.

These legal limits are not necessarily safe. TLVs are established to apply to the healthy person and do not

consider workers with special problems such as age, heart or lung disease, skin sensitivity, or small body size. You often are exposed to more than one chemical at a time, but the combined effects of several chemicals are not accounted for.

Some chemicals are also covered by other laws, such as standards for air pollution control. These standards frequently are stricter than OSHA standards. While New York City cannot be forced to comply with OSHA, it may be required to obey other laws affecting hazardous substances.

Measuring Chemical Hazards

Your exposure to chemical hazards is measured with a large variety of monitoring instruments especially suited for taking air samples. Many are expensive and elaborate and generally should be used by trained persons such as industrial hygienists. If you suspect that you are being overexposed to a hazardous substance, you should have your worksite monitored. Then you can compare the results with the minimum standards for a healthy environment provided by OSHA and other laws.

You and your health and safety committee should supervise the sampling procedure to make sure that your working environment is accurately recorded. Be sure that:

- The sample is taken from the air you and your co-workers actually breathe. One or more workers should wear a breathing sampler as close to the nose and mouth as possible.
- Samples reflect changes in the environment. Hours of peak exposure and variations due to weather, season, and work operations must be taken into account.

• Samples reflect the workday.

Generally a full 8-hour day should be monitored. When you are testing for Ceiling Values, make sure the peak exposure is monitored.

Two standard measurements are used to designate concentrations of hazardous substances. They are:

ppm (Parts per million). Designates parts of vapor or gas per million parts of contaminated air by volume.

mg/m³ (Milligrams per cubic meter). Designates milligrams of a substance per cubic meter of air.

Some Specific Substances to Which You May Be Exposed

HRs, TDMs, and MVOs are exposed to many substances that may be hazardous to your health. Some of the most common and important are discussed in the following chart. It is not a complete list. Such a list would be impossible. Many of the products with which you work do not disclose their chemical composition so hazardous chemicals are not identified. New hazardous chemicals are added when new machines, materials, or processes are introduced. You can do further research in the publications listed at the end of this manual.

The inclusion of a chemical does *not* mean that you are exposed—just that you might be. You have to be overexposed to some chemicals far above usual exposure levels before they can harm you. Information on how to determine which chemicals are in your workplace is presented in the section on health and safety committees. Medical screening tests, which can give advance warning of occupational illnesses, are described in the final chapter of this manual.

Hazardous Substances Commonly Found in Road Work

SUBSTANCE	LOCATIONS AND OPERATIONS WHERE EXPOSURE IS POSSIBLE	IDENTIFYING CHARACTERISTICS	IDENTIFYING SYMPTOMS	HEALTH EFFECTS	TLV AND TLV-C
Ammonia	Coal tar and pitch work. Painting.	Colorless gas.	Irritates eyes. Cough and chest pains. Burning of skin. Pink frothy spit.	Severe irritation of eyes, respiratory tract and skin. Consequences may include bronchitis or pneumonia.	50 ppm.
Asbestos	Insulation in garage. Brake linings.	Fibers of various sizes, colors and textures. The dangerous fibers are invisible.	May have no symptoms until disease is advanced. Shortness of breath. Chest tightness. Wheezing. Dry cough.	Asbestosis. Lung cancer. Cancer of digestive tract. Mesothelioma. Smoking increases the likelihood of disease.	2 fibers/cc (for fibers more than 5 microns in length)
Asphalt	Pothole repair. Paving.		Itchy and inflamed skin. Irritated eyes.	Dermatitis. Increased likelihood of skin cancer from the sun. Burns.	
Benzene	Coal tar and pitch work. Degreasing. Painting and paint removal.	Colorless liquid with characteristic odor. Highly flammable.	High doses cause drowsiness and fainting. May irritate eyes, upper respiratory tract and skin. Nose bleed or bleeding gums.	Benzene poisoning (dizziness, fatigue, loss of appetite, irritability, nervousness). Anemia and other blood disorders. May be connected to leukemia. May cause damage to chromosomes.	1 ppm. 5 ppm TLV-C.
Calcium Oxide (Lime)	Cement work. Painting. Chipping, drilling or scraping paved surfaces.	White or grayish lumps of powder. May have yellowish or brownish tint in the presence of iron.	May burn skin, eyes, upper respiratory tract.	Conjunctivitis, Dermatitis or burns. Severe irritation of nose, respiratory passages.	5 mg/m ³ .
Carbon Disulfide	Degreasing. Using Solvents. Painting. Insecticides.	Colorless liquid. Volatile.	Headache, giddiness.	Acute danger of brain damage and irritation of lung and stomach. Chronic exposure may affect nervous system and heart.	20 ppm. 60 mg/m ³ .
Carbon Monoxide (Exhaust Fumes)	Traffic. Garage. Any place carbon fuels or products are being burned.	It is impossible to detect this colorless, odorless gas.	Headache, throbbing headache, reddening of skin, weakness, dizziness, blurred vision, nausea.	Prevents blood from carrying oxygen to the body and can cause serious systemic disorder including death. Smoking increases susceptibility to serious problems.	50 ppm. 55 mg/m ³ .
Cement (Portland Cement)	Paving. Chipping or drilling cemented surfaces.	Solid, irritating in dust form.	Eye and nose irritation. Skin disorder.	Irritates eyes and skin.	

SUBSTANCE	LOCATIONS AND OPERATIONS WHERE EXPOSURE IS POSSIBLE	IDENTIFYING CHARACTERISTICS	IDENTIFYING SYMPTOMS	HEALTH EFFECTS	TLV AND TLV-C
Chromates	Brightly colored paint.		Nosebleed, headache. Itchy and inflamed skin.	Lung cancer (may develop 20-30 years after exposure). Severe irritation of upper respiratory tract, skin, lungs. Perforation of nasal septum.	0.5 mg/m ³ .
Coal Tar and Fractions (pitch, creosol, creosote, acridine, anthracene)	Whenever coal tar is heated.	It is the coal tar pitch volatiles that cause health problems.	Irritation of eyes. Sunburn.	Severe sunburn, dermatitis. Irritation of the eyes. Increases susceptibility to skin cancer from exposure to the sun.	0.2 mg/m ³ .
Dioxane	Solvent widely used in asphalt work, degreasing painting, paint removal.	Flammable liquid.	Irritation of eyes, nose and throat. Drowsiness, headache, nausea and vomiting indicate poisoning.	Passes through skin without damaging it but prolonged contact may produce dermatitis. Severe kidney damage. Severe liver damage. May cause brain damage. May be fatal.	100 ppm 360 mg/m ³ (skin).
Epoxy Resins	Pothole repair.	May be solids or viscous liquids.	Dermatitis, eye irritation.	Epoxy resins are a major source of skin problems. Irritation to lungs.	None set.
Fiberglass	Nightliner.	Needle-like fibers of various sizes, colors, textures (Safety Spheres).	Dermatitis, itching.	Skin irritation. Lung irritation.	None set.
Gasoline	Engine fuel. Solvent dilutant.	Liquid with characteristic odor. Flammable.	Dermatitis, eye irritation.	Skin irritation. Can affect the central nervous system. Lead additives may cause problems associated with lead. Gasoline may also contain benzene.	None set.
Lead	Paint, gasoline additive. Automotive exhaust.		Symptoms of lead poisoning are inability to sleep, fatigue, constipation. Blue or "leadline" on gums may appear.	Severe, prolonged lead poisoning leads to anemia colic and neuritis. May affect brain causing headache, loss of appetite blurred vision. May affect nerves and cause pain and tremor after a long time, can affect kidneys. Effects are slow and cumulative and do not cease immediately upon removal of exposure.	0.15 mg/m ³ .

SUBSTANCE	LOCATIONS AND OPERATIONS WHERE EXPOSURE IS POSSIBLE	IDENTIFYING CHARACTERISTICS	IDENTIFYING SYMPTOMS	HEALTH EFFECTS	TLV AND TLV-C
Methyl Alcohol (carbinol, wood spirits, wood alcohol methanol)	Solvents, paints, cements, antifreeze.	Colorless, volatile liquid with very mild odor.	Dry, cracked skin.	Defats skin and produces a mild dermatitis. Poisoning may produce blindness in extreme cases.	200 ppm.
Methyl Ethyl Ketone (MEK)	Solvent. Paint thinner.	Colorless liquid.	Irritation of eyes, nose and throat. Dermatitis. Repeated exposure to high concentrations may cause numbness of fingers, arms and legs. Extremely high concentrations may cause drowsiness.	Irritation of eyes, mucous membranes and skin. Severe exposure can affect nervous system.	200 ppm.
Methylene Chloride	Solvent. Paint stripping. Degreasing. Insecticide.	Colorless liquid.	Fatigue, weakness, sleepiness, light-headedness. Numbness and tingling of limbs. Nausea. Splashes irritate skin and eyes.	Irritating to eyes but does not cause serious injury. Irritating to skin. Mild central nervous system depressant. May cause liver and kidney damage in high concentrations. Causes increased carbon monoxide levels in blood.	200 ppm.
Toluene	Solvent for paint. Paint thinner. Component of gasoline. Cleaning agent.	Colorless liquid.	Fatigue, weakness, confusion, euphoria, dizziness. Headache, dilated pupils.	Depression of central nervous system. Severe exposure may damage liver or kidneys. Splashed in eyes causes eye irritation. Prolonged skin contact can cause dermatitis. May be contaminated with benzene.	100 ppm.
Turpentine	Solvent. Paint thinner.	Colorless or yellow volatile liquid.	Irritation of eyes, nose and throat. Dizziness, nausea. Irritation of skin.	Bladder damage, kidney damage. Dermatitis, conjunctivitis. Central nervous system depression. Splash can burn eyes.	100 ppm.

You Can Eliminate or Control Chemical Hazards

Once you have identified the hazardous toxic substances on your job, you and your health and safety committee can work to eliminate or control them. The best way is to eliminate the hazards at their source:

Substitute safe or less toxic chemicals for toxic substances. For example, use turpentine instead of benzene, kerosene instead of gasoline, zinc pigments instead of lead.

Substitute safer processes. For example, transfer hazardous substances from storage vats to smaller containers for use through closed, mechanical systems; minimize dust by using pellets or briquettes instead of bulk materials.

Store chemicals in steel drums or glass carboys in a cool dry place away from direct rays of the sun or other heat source. Vent drums and carboys at least once a week. Make sure containers are not leaking and are securely placed.

Eliminate storage of incompatible substances in close proximity. Even small leaks may allow mixing that could produce deadly gas or vapors. For example, do not store acids near oil, grease or fine metal dusts; keep hydrofluoric acid away from ammonia.

Makes sure all containers have labels that clearly disclose their chemical content and any special warnings.

Clean chemical spills immediately. Spills of chemical dusts should be cleaned by a wet method to prevent spreading the dust.

Keep chemically soaked rags and other wastes in closed metal containers which are removed from the worksite frequently.

The dangerous effects of hazardous substances can be eliminated or

controlled by:

Eye wash stations and deluge showers. The only way to limit severe chemical burns is by immediate flooding with water. The first 15 seconds after an injury is the most vital. Fresh water must be within the immediate reach, 25 feet, of all workers who use acids, caustics and similar chemicals. Running water is preferable. However, a large container of still water, such as a 5 gallon drum, is useful. A wide variety of portable equipment is available.

Separate facilities for eating and smoking.

Facilities for changing, laundering and washing workclothes. Workclothes absorb hazardous chemicals and prolong exposure. Wearing workclothes home or washing them with the family laundry can sometimes expose your family to serious illnesses.

Washup facilities for workers. Adequate supplies of hot water, cleaning agents and handcreams can reduce skin problems and exposure to hazardous materials. Washup facilities must be available before eating and at the end of the workday. Cleansing agents and handcreams must be

compatible with the substances on your job.

When it is impossible to eliminate or sufficiently control hazardous substances at your workplace, personal protective devices should be worn. Personal protective devices can also provide double insurance against contamination. They include:

Respirators

Respirators prevent entry of harmful substances through breathing and make sure that you have an adequate supply of clean oxygen. Different hazards require different respirators.

Air-cleaning respirators draw the air you breathe through a filtering device to remove harmful gases, vapors and dusts.

Respirators for gases and vapors use cartridges or canisters. Different gases and vapors require different cartridges and canisters—you must use the right one. They must be clearly labeled and color-coded. Cartridges and canisters wear out and can be stored only for limited times—make sure they are fresh. They should not be used in air that is immediately harmful

COLOR CODE FOR GAS AND VAPOR CANISTERS USED WITH RESPIRATORS

Substance to Be Protected Against	Color
Acid gases	White
Organic vapors	Black
Ammonia gas	Bright green
Carbon monoxide gas	Blue
Acid gases and organic vapors	Yellow
Acid gases, organic vapors, and ammonia gas	Brown
Acid gases, organic vapors, ammonia gas, and carbon monoxide	Red
Other vapors and gases	Olive
Dusts, fumes and mists (nonradioactive)	Orange
Note: An orange band designates dusts, fumes and mists in combination with any other gas or vapor.	

to life or health.

Respirators for dust, mists, smoke or other solids use filters in canisters or cartridges. Filters are specific for particular type of particles (silica, asbestos) or classes of particles (dusts, fumes, mists). When breathing becomes difficult, clean or replace the filter. If you can see particles inside the respirator, it is not working properly.

Respirators for gases and vapors do not remove dusts, and particle filters do not protect against gases and vapors. It is necessary to fit filters to canisters and cartridges.

Air-supplied respirators are used when the oxygen supply is limited or you are exposed to immediately hazardous materials. They are self-contained and supply an air source to a face mask.

To select the proper respirator, you must know:

- The identity of each hazardous substance.
- How dangerous it is, how it enters and affects your body.
- Its concentration in the air you breathe.
- The exposure time.

Respirators will be effective only if:

- They fit properly.
- Workers are trained how and when to use them.
- Respirators are readily available and labeled.
- There are regular inspections, cleaning and replacement of all respirator parts.
- Respirators are stored in a sanitary plastic bag or container.
- NIOSH approved (a NIOSH certification number must be stamped on the canister and the respirator).

Respirators are uncomfortable, may interfere with your vision or make it

difficult to breathe. They are a last resort. But, they can save your life.

Gloves

Gloves can protect you against skin problems and entry of hazardous substances through your hands. They also reduce cuts, abrasions, and burns that open your body to penetration by toxic chemicals. To be effective, gloves must provide protection against the specific hazards you face. Some guidelines are:

Cuts, abrasions, blisters. Knit cotton, jersey or heavy nylon generally are adequate. However, if especially rough or sharp materials are handled, leather gloves may be necessary. Special guards for cuffs and forearms, thumb guards, finger cuts and protective wrapping tapes give added protection. Be sure they do not become saturated with or trap toxic chemicals.

Electricity. Specially made and tested rubber gloves are required which must be worn inside of protective leather gloves. Never wear gloves with metal parts or reinforcements around live current. Test and inspect frequently and discard gloves that do not meet the specifications.

Flame and heat. Treated asbestos or aluminized gloves provide protection against flame. Heavy leather may protect for a short period. Some gloves of synthetic fibers, terry cloth or loop pile resist heat. Gloves should be tested before use. Keep gloves free of oils, gasoline and other flammable or combustible materials.

Chemicals, alkalis, solvents. Protective materials include natural rubber, synthetic rubber, olefin, neoprene, vinyl, polypropylene, and specially coated fabrics. Gloves must be specially adapted to the substance

to be protected against. Natural rubber is not suited for use with oils, grease, and many organic solvents and chemicals. Long-sleeved gloves with turn-back cuffs are advisable near liquids. Washing and airing gloves after use is important.

Barrier Creams

Barrier creams can also protect your hands. They must be selected for the specific job—dusts, water, sun, plants, water-soluble chemicals, oils or solvents. Protective cream should be applied to clean hands before work operations begin. Remove it before eating and reapply after lunch. Wash off at the end of the day.

Clothing

Your clothing can protect you against skin exposure to hazardous substances. Longsleeved shirts fastened at the wrists and long cuffless pants provide maximum coverage. If clothes become saturated with an acid or caustic, they should be changed immediately. Work clothes should be separate from street clothes and laundered frequently, preferably in facilities at your worksite. Other personal protective devices include:

- Eye protection: face shields, goggles, safety glasses.
- Aprons
- Impervious footwear.

Noise

I used to sing a lot. We had this little group but after years on the highway using those compressors, I just don't hear well enough anymore.

—An HR in Brooklyn

Not all air pollution is caused by hazardous chemicals. Air waves also can be contaminated by hazardous sounds. Unwanted sounds are called noise. When noise is persistent enough and/or loud enough, it can be hazardous to your health.

Measuring Noise

You do not need complex devices to determine whether you are suffering from noise pollution on your job. If you cannot hear a co-worker talking an arm's length away from you, the noise level is probably too high. And if you find it hard to hear normal conversations, TV or music at the end of the working day but you are fine after 14 hours away from your job, the noise on your job probably is so loud it is causing hearing loss.

OSHA and other experts use more formal measures. They use a sound level meter to measure the loudness of noise in "decibels." Each increase of 10 decibels means that the sound is

10 times louder. For example, a pneumatic drill at 100 decibels is 10 times greater than acetylene welding equipment at 90 decibels, and an automatic drop hammer at 110 decibels is 10 times greater than the pneumatic drill and 100 times greater than the welding equipment. (Normal conversation is 60 decibels.)

Health Hazards of Noise

Excessive exposure to noise is dangerous. Loud sudden noise can create so much pressure on your ear drum that it breaks. Punctured ear drums are extremely painful and may cause significant hearing loss.

Exposure to noise above 80 decibels over an 8-hour day can also cause hearing loss. It strains the nerves of your inner ear and they become tired and inefficient. When these nerves fail to send messages to your brain, your hearing ability is decreased. This decrease is called a "temporary threshold shift" (TTS) because a sound must be louder for you to hear it. For example, a 20 decibel TTS means that a sound has to be 100 times louder than before for you to hear it.

TTS is temporary. If your nerves are allowed to rest for long enough periods between exposures, they can recuperate and hearing will be restored. However, after about 10 years on a job noisy enough to repeatedly cause temporary threshold shift, your nerves may become permanently fatigued. Permanent noise-induced threshold shift (PNTS) is not reversible. It cannot be corrected by hearing aids or surgery.

Constant exposure to noise is a source of stress and can affect more than your hearing. Noise can cause other body changes such as increased blood pressure and heart beat rate, increased adrenaline output, and the

release of extra fats and chemicals into your bloodstream. As a result, you may become tired, irritable or nervous. In the long run, you may face increased risks of circulatory or gastrointestinal problems.

Noise also interferes with communication and may block out warning signals. You want to hear a co-worker's shout, a backup beeper, or an approaching tractor-trailer.

You Can Decrease Noise Hazards

You and your health and safety committee can develop methods to

Noise Levels	
Noise Source	Sound Power In Decibels
Jet engine	140
Riveting on steel tank	130
Cutting machine hardened tools	120
Pneumatic hammer	110
Pneumatic drill	100
Shouting to be heard a few feet away	90 80 70
Voice, normal conversation	60 50 40
Very soft whisper	30 20 10
Threshold of hearing	0



protect you and your co-workers from the hazards of exposure to noise. The health hazards of noise are determined primarily by the loudness of the noise and the duration of the exposure.

The current OSHA standards restrict the period of exposure according to the sound level. The basic standard is 90 decibels averaged over an 8-hour day. Higher sound levels have shorter time limits. Remember, however, that hearing loss can begin at 80 decibels so that the OSHA standard is an absolute maximum and should be improved upon.

Methods of decreasing exposure to noise include:

Decrease noise production at the source. Noisy machines such as compressors, drills, and hammers can be fitted with rubber linings, mufflers or other parts to reduce noise.

Change work processes. Job assignments could be rotated to take into account differences in noise exposures. For example, the greatest amount of hearing loss occurs during the first hour of exposure and seems to level off after that; interrupted, or intermittent noise, appears to cause about half the TTS that continuous noise does; lost hearing can be recovered during rest periods.

Provide personal protective devices. If you must be exposed to noise, management should supply you with hearing protection devices. The best protective device is the earmuff; it reduces the most noise, is least likely to cause ear infection and requires least personalized fitting. However, ear muffs should be a last resort.

Institute a medical screening program for individual workers. Yearly testing of each worker will reveal those who are suffering from hearing loss. Audiometric tests are not complicated and results can be confidential.

Weather

This is as bad as a steel mill. But there you can get out of the furnace room once in awhile.

—An HR in mid-July

Working outdoors exposes you to special health hazards that are not encountered on most jobs. The weather conditions in which you work can cause occupational illnesses ranging from the common cold to cancer. The most important conditions are temperature and sun.

Temperature

The average person is comfortable in a very narrow range of temperatures. The average comfort temperature is 73° F. at 45% humidity. Physical activity generates body heat so an even lower temperature range, 55-67° F., is considered comfortable for active work. Humidity and air movement also affect the comfort range.

When you work in temperatures outside of this range, you probably feel

hot or cold and may also feel tired, unable to concentrate, slowed down, or stiff. You should not ignore your body's warnings that the temperature is affecting you. Working while below par due to heat or cold can cause accidents and may have serious health consequences.

Heat

Your body has an internal thermostat that tries to keep your body temperature at 98.6° F. (37° C.). It does this primarily through using body heat to evaporate water on your skin's surface—commonly known as sweating. Your ability to maintain a constant body temperature through sweating is determined by the intensity and duration of hot weather and the moisture already in the air (humidity).

During the first few days of exposure to heat, this thermostat is very inefficient and your body temperature rises to a feverish level. Your heart and pulse rate increases, you feel hot and miserable. After about one week, your body adjusts your circulatory system and changes the volume and composition of your sweat so that it can get rid of more heat. This process is called "acclimatization."

The ability to acclimate to heat varies from person to person. Young people acclimate better than older people. Moreover, if you leave the hot temperature for more than one week, you may lose between one-fourth and two-thirds of the acclimatization. An absence of three weeks usually causes a total loss.

Health Hazards of Heat

If you are not acclimated or if intense and prolonged heat overwhelms your body's ability to adjust, you may suffer several unhealthy reactions to heat:

Heat rash (Prickly heat). Excessive or unbalanced sweating can plug up sweat ducts and cause an inflammation. Sweating may be reduced by the rash and decrease your heat tolerance. It may, therefore, lead to more serious problems and should not be ignored.

Heat cramps. Prolonged sweating with inadequate replacement of salt can lead to muscle spasms—usually in arms, legs and abdomen.

Heat exhaustion (Heat fainting). Due to dehydration or low blood pressure from physical exertion. Results in headache, tiredness, nausea, dizziness, clammy skin, heavy sweating and, maybe, fainting.

Heat stroke. Sweat suppression and increased storage of body heat to high body temperature (106° F.) which causes extreme stress. Symptoms include hot dry skin, mental confusion, convulsions, and eventually coma.

Treat promptly—may be fatal.

Chronic illness. Prolonged or repeated exposure to extreme heat may increase heart problems.

Control of Health Hazards Due to Heat

Until we really can "do something about the weather," you cannot control the heat itself. However, health hazards due to heat can be eliminated or reduced by measures such as:

Restricted activity. Jobs that require heavy physical exertion should not be done on hot days. If they must be done, they should be done during the coolest hours of the day, or at night.

Acclimatization period. Work at the beginning of the summer should be phased to allow for an adjustment period.

Rest periods. Regularly scheduled rest periods, in a cool location if possible, allow the body to get rid of excess heat. In periods of extreme

heat, ratios of 25% work to 75% rest each hour may be necessary. In moderate heat, a rest period of 15 minutes per hour may be sufficient.

Job rotation. Particularly heavy work may be shared among several workers to reduce individual exposures.

Water and salt tablets. Plenty of cool drinking water and salt tablets should be provided to prevent dehydration and replace salt lost in sweating.

Clothing. Wet clothing decreases evaporation of sweat from the skin.

Cold

Your body cannot acclimate to cold. It has two mechanisms for preventing loss of body heat in cold weather. However, both are not healthy if prolonged. First, blood vessels supplying the skin, hands and feet constrict so that less blood flows to the surface of your body and less heat is lost. Your hands and feet become numb from loss of blood. The second method is shivering, which actually is rapid muscle contractions that generate heat. If you are continuously exposed to cold, you may develop local acclimatization in your hands. Moreover, it is possible to get used to the cold so that you are less uncomfortable. This is called "habituation."

Health Hazards of Cold

Frostbite. When the body keeps hands and feet cold in order to conserve body heat, they may actually freeze. Crystals of ice can form in tissues and damage them. Severe frostbite may require amputation. Frostbite is never reversible and chronic symptoms, such as pain, numbness, excessive sweating and abnormal color, can appear at anytime. Cold intensifies the symptoms.

Trench foot (Immersion foot).

When the foot is exposed to cold in the presence of moisture, without freezing, blood vessels go into spasm and stop circulation to the foot. Injures muscles and nerves and may cause extensive damage, sensitivity to cold and may last for years.

General body reaction. Decrease in body and brain temperature can cause fatigue, weird behavior, loss of consciousness, and coma.

Control of Health Hazards Due to Cold

You need not suffer discomfort or health hazards due to cold. Protective measures include:

Decreased exposure. Where possible, work should be done elsewhere and then moved to the cold location. For example, parts should be prefabricated and maintenance done in warm areas.

Rest periods. Regularly scheduled rest periods in a warm location allow the body to restore its body temperature to normal and relieve hands and feet.

Warm beverages. Warm beverages should be supplied periodically.

Clothing. Cold-weather clothing is designed to provide a barrier to cold and insulate the body. However, body heat generated by muscular activity must be allowed to escape. Sweat-soaked clothing leads to overheating. Therefore, clothing should be vented or layered. Special attention should be paid to gloves and footwear.

Sunlight

The sun is a source of ultraviolet radiation. HRs and TDMs, who work outdoors, can suffer from overexposure to ultraviolet radiation from too much sunlight. Pothole repairers, pavers and other workers who are exposed to

chemicals such as coal tars and creosols have an additional hazard. These chemicals are photosensitizing agents, which means that they make the skin especially sensitive to the effects of ultraviolet radiation.

Severity of illness varies with exposure time, intensity of sunlight, distance from the sun, and individual sensitivity. There is no legal limit for exposure to ultraviolet radiation. The standards that have been suggested are based on the reddening of the skin in response to exposure. However, any reddening is an indication of overexposure. Overexposure can cause:

Skin burn. May include reddening of the skin, blistering and pain.

Conjunctivitis. Overexposure of the eyes can dry out the mucous membranes and cause lesions of the cornea, which are very painful. May appear 6-8 hours after exposure.

Skin cancer. Outdoor workers have a higher than average rate of skin cancer. This is increased in workers exposed to photosensitizing agents such as coal tar and creosote.

Protective measures from overexposure to the sun include:

Substitution. Nonphotosensitizing substances should be substituted on outside jobs to decrease risk of hazardous effects such as skin cancer.

Job rotation. Individual cumulative overexposure can be reduced by rotating between outside and inside jobs, day and night jobs and jobs that do not use photosensitizing agents.

Nonreflectorized surfaces. Shiny metal objects and other reflecting surfaces should be eliminated from the jobsite.

Protective clothing, eyeglasses and barrier creams. Protective clothing, eyeglasses and creams may be a nuisance but they reduce the hazards of ultraviolet radiation.

Stress

It's bad enough that we work in 90 degree heat, slash and snow, and they don't give us the right tools to use.

But when motorists spit at us, curse us and throw cones at us, I really have to wonder what I'm doing here.

—A TDM in the Bronx

Do you often complain that your job gives you a headache? It may—headaches are a common early warning sign of stress. Other symptoms of chronic stress include:

- skin rashes
- insomnia
- backache
- tremors
- reduced appetite
- loss of weight
- irregular bowel movements
- indecision
- nervousness
- lessened interest in sex
- poor memory
- irritability

Many of these symptoms also may indicate other diseases or reactions to chemicals or climate. However, chronic stress is an occupational illness that should not be overlooked.

What is Stress?

Stress is the response of your body to any demand put on it. It actually is a defense mechanism that allows the body to focus its resources where they are needed.

When an unusual demand is made, there is an automatic response. Your body starts a series of internal chain reactions which include an increase in heart beat and breathing rates, the release of extra energy supplying chemicals—glucose and fats—into the blood, and constriction of all small blood vessels, especially those of the intestines, so that energy is directed to your muscles and brain. In normal situations, this is a temporary condition. The demand is met or passes and the body returns to a balanced state.

However, if the demand is continuous, prolonged or repeated, the body is kept on emergency status beyond its endurance. The protective mechanisms become destructive and the body becomes stressed.

What are the Health Hazards of Stress?

Work-related, stress-induced illnesses have been recognized by Workers' Compensation Boards in several states as compensable occupational diseases. The medical research linking stress to disease is in its early stages and no one really knows all the diseases to which stress contributes. However, workers in stressful jobs do suffer certain diseases more than other workers do. These diseases include ulcers and colitis, migraines, asthma, and coronary heart disease.

Coronary artery disease is a particularly serious stress disease. Stress can speed up the formation of cholesterol plaques in the walls of small arteries. This can lead to a decrease in blood and oxygen supply to the heart muscle. A heart attack, which is the death of heart muscle from lack of oxygen, can occur when blockage of an artery to the heart muscle is complete. It also can happen when the heart is pumping rapidly and demands more oxygen than can pass through an artery that has been narrowed by cholesterol plaques. Stress can cause such an increased demand.

Cigarette smoking, which often increases in stressful periods, can intensify the bad effects of stress. For example, cigarette smoking further decreases the blood supply to the heart muscle. Similarly, both stress and cigarette smoking may aggravate a pre-existing case of emphysema.

Stress is a physiological condition and should not be confused with nervous tension. However, stress can lead to mental health problems or emotional illnesses such as chronic anxiety and worry, depression and psychosomatic illnesses.

The use of alcohol to relieve some of the symptoms of mental or emotional stress can cause new problems. If you work with chlorinated hydrocarbon solvents, such as carbon tetrachloride or tetrachloroethane, even moderate alcohol use can cause liver damage or chemical hepatitis, which, if repeated, can lead to cirrhosis. Chronic use of alcohol leads to addiction, which, in turn, causes serious mental and physical disease. Drug use on the job may impair your judgment or reaction time and increase the danger of an accident.

Causes of Stress on Your Job

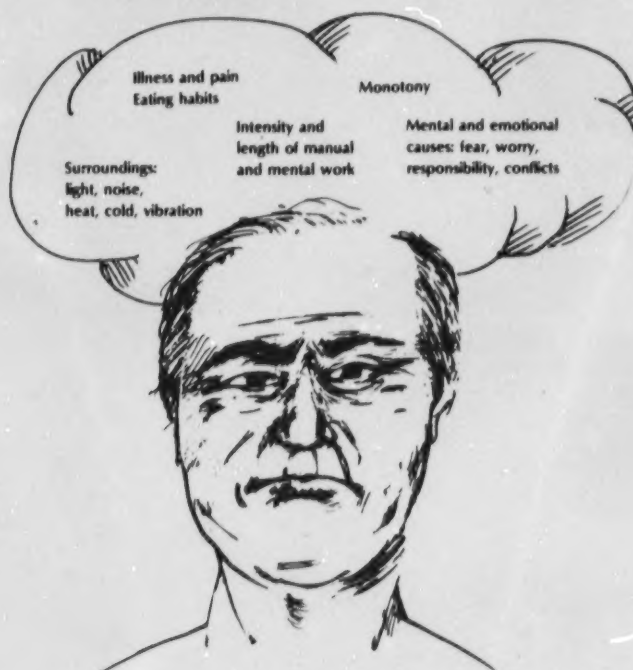
Unfortunately, you probably do not have to think too hard or too long to come up with a list of causes of stress to HRs, TDMs, and MVOs. Just working in traffic and confronting the ungrateful

or hostile public is enough! However, it is helpful to organize your list into categories that can be compared with those of your co-workers.

Physical conditions. Traffic, faulty or inadequate vehicles, equipment and tools; fire; chemicals; noise; weather; others.

Rate of work for repetitive tasks. Fast repetitive motions can cause strain, fear, anxiety, fatigue, depression, loneliness and loss of identity; a slower rate that requires full attention to a boring, monotonous or meaningless task can also be stressful.

Lack of job satisfaction. Frustration because job does not use your skill or intelligence; no opportunity to learn new skills; no opportunity for decision-making or input; no recognition for a job well done; no camaraderie with co-workers.



Psychological pressures. Fear of unsafe or unhealthy working conditions; fear of lay-off; financial insecurity caused by a gradually decreasing income due to failure of wages to keep pace with inflation; seeing a co-worker injured, laid-off or reprimanded; feeling powerless to improve your job conditions.

Relieving Occupational Stress

As with all other occupational safety and health hazards, it is necessary to fix the workplace—not the worker. Once you and your health and safety committee have compiled a list of stressors, you can develop methods to improve your working conditions to eliminate or reduce them. These might include:

- Provision of traffic control, operative and adequate vehicles, equipment and tools, fire protection.
- Reduction of hazards from chemicals, noise and weather.
- Redesign of job to provide challenging work at a reasonable production rate.
- Allowing workers to change jobs and acquire new skills.
- Protection of financial and job security.
- Provision for exercise programs and adequate rest periods.
- Provision for more worker decision-making and input on a day to day basis and through labor-management committees.

Even before these changes are begun, you can relieve a lot of your own stress by directing your tension, anger and frustration into organized efforts to improve your job. Join with your co-workers to form a strong health and safety committee and an even stronger union.



Using Your Union

The main thing of health and safety is the enforcement of it. Knowing what's wrong and what to do is one thing. But getting it done, that's the problem. That's when we all have to push together.

—A shop steward for HRs.

When you talk to your co-workers about the injuries and illnesses you have suffered on your job or about the potential health and safety hazards that concern you, you find that you are not alone. Highway Repairers and Traffic Device Maintainers, and Motor Vehicle Operators throughout the City confront the same, or similar, dangerous work conditions every day. The problems may seem overwhelming to tackle by yourself. And they often are. But, if you join together, you can make management meet its responsibility to provide a healthy and safe workplace.

You already have a lot of experience in joint action with your co-workers. You are already a part of your Local Union, a part of District Council 37, AFSCME, organized to represent your common interests, such as wages, hours, vacations, and retirement. Workers in other industries, including those covered by OSHA, have learned that their Union is their best weapon in the fight for occupational health and safety. You can benefit from their experience.

This chapter contains information that will help you and your co-workers use your Union to identify and resolve specific health and safety problems on your job.

The Grievance Procedure

The city-wide contract promises that your working conditions will be safe and healthy. Article XIV, Section 2, of the 1978-1980 contract provides that:

- Adequate, clean, structurally safe and sanitary working facilities shall be provided for all employees.
- Motor vehicles and power equipment which are in compliance with minimum standards of applicable law shall be provided to employees who are required to use such devices.

If you think that your working conditions violate this contractual guarantee, you can file a grievance. Consult your shop steward as soon as possible.

Before filing a grievance, remember:

- It may be possible to get the situation corrected faster through another route, such as informal discussions with management. Try these first.
- The grievance should be carefully written to state a clear violation of the contract. You will be bound by the exact words in your grievance. Get help from your shop steward or health and safety committee before you give it to management.
- The more evidence you have to support your claim, the more

likely you are to win. Take careful notes and even photographs, keep records, talk with your co-workers, keep files of Workers' Compensation cases, medical records and other papers that will

be useful to document your case. • Think of steps management could take to eliminate or reduce the hazard. Your case will be stronger if you can prove that your complaint is reasonable.

Grievance Form	
To: <u>Commissioner Giordano</u>	One copy each to: ☐ Management ☐ Employee ☐ Union office ☐ Your copy ☐ 1st Step Supervisor (on step 2 grievances only)
Grievance Step <u>II</u>	
Aggrieved employee (or group) <u>Wilfred Rock</u>	
Shop Steward, MVO Dept. of Traffic	
Home Address <u>45 Fairview Avenue</u>	Title <u>Motor Vehicle Operator (MVO)</u>
<u>New York, N.Y.</u>	Work Location <u>Pan Am Building</u>
Home phone <u>none</u>	Dept. or Agency <u>Traffic</u>
	Work Phone <u>EM 1 8000</u>
NATURE OF GRIEVANCE	
<u>MVO personnel have been denied the use of a Department of Traffic toilet facility on their work location while the same facility is being used by other employees in the Department. This policy of denial is not only discriminatory but has caused a serious health problem for the employees involved, not to mention the embarrassment.</u>	
ACTION SOUGHT <u>Department of Traffic toilet facility be made available to the Motor Vehicle Operators on the location in question.</u>	
District Council 37, American Federation of State, County & Municipal Employees, AFL-CIO 140 Park Place, New York, New York 10007	
Local Union Number <u>983</u>	Union Representative or Steward's signature <u>Richard DeLongo</u>
Date <u>4-23-78</u>	Employee's signature <u>Wilfred Rock</u>
ACTION TAKEN (Summarize, or attach the management's reply. If more room is needed, continue on back of this sheet.)	
<u>Seventh floor toilet facilities were made available on a 24-hour basis to MVO's.</u>	
(Supervisor)	

Health and Safety Committees

The Health and Safety Committee is the best way to harness the experience, resources and energy of all Local Union members to work as a team to push for occupational health and safety. The Committee can:

- Gather information from Local Union members regarding health and safety hazards on worksites throughout the Department.
- Do research on specific hazards.
- Keep records on hazards, accidents, illnesses, injuries and complaints made to management in a centralized and organized system.
- Educate local members about the specific health and safety hazards that confront them.
- Make specific recommendations for improvements.
- Work with the Local's representatives to the Joint Labor-Management Health and Safety Committee to get the Department to implement the Local's recommendations.
- Work with District Council 37 officers and staff to improve health and safety in contract negotiation and enforcement and to develop health and safety training and education.

Gathering Health and Safety Information

You and your co-workers are a major source of information about health and safety conditions on your jobs. You know a lot about specific hazards, the injuries and illnesses, and the corrective measures, actual and potential, that are possible on your worksite. Therefore, your input is the foundation on which your health and safety committee must build its work. The committee cannot visit every

worksite. You and your co-workers must be its field agents.

One of the first tasks of your health and safety committee will be to develop forms that will help it to gather information from you and your co-workers. (While forms by themselves do not accomplish anything, it is impossible to make significant changes without accurate information.)

These forms may include:

Hazard identification form. Used to bring a hazard of special concern to the attention of the health and safety committee.

Health and safety hazard checklist. A checklist of all hazards on your worksite gives a good overview of your problems. It should be completed when the committee begins its work and as often as possible thereafter.

History of work-related injuries and illnesses. Hazards that result in injury or illness are of special concern. A history should be completed when the committee begins its work and once a year thereafter.

In addition, you should always provide your health and safety committee with a copy of any of the following documents that you may file:

- Grievance based on health or safety provisions of the contract.
- Workers' Compensation claim.
- Disability claim.
- Third-party lawsuit based on a work-related accident, injury or illness.

Some sample forms that may be used to gather information from you and your co-workers appear on the following pages:

How to Form a Health and Safety Committee

The structure of the health and safety committee must be adapted to

the special needs of your Local. However, you can learn from the experience of other union health and safety committees. Some guidelines include:

- Committees should have a minimum of five members, one from each borough, who are appointed or elected by the Local. They should serve for a minimum term of 1 year. Staggered terms prevent total turn-over at one time.
- Borough committeemen should form subcommittees in order to adequately cover the scattered

worksites within their jurisdiction.

- Committee and subcommittee members should be chosen on the basis of interest, ability to work cooperatively with others, and willingness to work very hard. Technical expertise can be developed by anyone who knows the processes of the jobs in the Local.
- Procedure for committee selection should be determined by the Local.
- Before the committee begins its work, it should:

- Become acquainted with DC 37 staff with health and safety responsibilities and expertise. They can help.

- Become familiar with Local officers and representatives to the Labor-Management Health and Safety Committee. You will be working together closely.

- Obtain space to collect and store files, records, books and other materials. Access to a desk, telephone, typewriter, copying machine and stationery may also be necessary.

Sample Hazard Identification Form

(Note: Use a separate form for each hazard identified.)

Department _____

Location (Be specific) _____

Date _____

Describe the hazard (Please include, if known, its trade name, chemical name, manufacturer, series, etc.) _____

If you have a label, please attach it.

Number of persons exposed _____

Frequency of exposure _____

Has an injury resulted from this hazard? _____

Has an illness resulted from this hazard? _____

If so, please describe _____

Any other information to identify this hazard or its severity _____

Submitted by: _____

Sample Health and Safety Hazard Checklist

Employee Name (Optional) _____
 Department _____ Work Location _____
 Work Being Done _____
 Date _____ Time _____

Code: A = None at location
 B = Inadequate supply
 C = Defective
 D = Not in use
 E = Used improperly

I. SAFETY HAZARDS

For each of the following items, mark with the letter or letters that best describe its condition.

A. Traffic Control

Letter(s) Comments

Signs	_____
Arrow panels	_____
Flashing lights	_____
Steady burning lights	_____
High level warning devices	_____
Barricades	_____
Vertical panels	_____
Drums	_____
Cones	_____
Flags	_____
Backup vehicles	_____

B. Vehicles (If more than one, duplicate information for each vehicle on the back of this form.)

VEHICLE NUMBER: _____

Letter(s) Comments

Steering	_____
Brakes	_____
Tires	_____
Wipers	_____
Lights	_____
Handles	_____
Runningboards	_____
Mufflers	_____
Safety belts	_____
Back-up alarm	_____
Shocks	_____
Roll bars	_____
Other (specify)	_____

C. Equipment and Tools (Identify specific piece(s) of equipment that you are commenting on.)

	Identification	Letter(s)	Comments
Operating controls	_____	_____	_____
Guards	_____	_____	_____
Insulation	_____	_____	_____
Grounding	_____	_____	_____
Ladders	_____	_____	_____
Tools (specify)	_____	_____	_____
Other (specify)	_____	_____	_____

D. Fire

	Letter(s)	Comments
Fire extinguishers	_____	_____
Special storage containers	_____	_____
Special waste disposal containers	_____	_____

II. WORKSITE

	Letter(s)	Comments
Eyewash stations	_____	_____
Deluge showers	_____	_____
First aid kit	_____	_____
Drinking water	_____	_____
Eating facilities	_____	_____
Washing facilities	_____	_____
Toilet facilities	_____	_____
Pest control	_____	_____
Other (specify)	_____	_____

III. PERSONAL PROTECTIVE EQUIPMENT

	Letter(s)	Comments
Respirator	_____	_____
Vests	_____	_____
Gloves	_____	_____
Hardhats	_____	_____
Ear protection	_____	_____
Eye protection	_____	_____
Footwear	_____	_____
Barrier cream	_____	_____
Other (specify)	_____	_____

IV. HEALTH HAZARDS

A. Hazardous Substances

Have you experienced any of the following while at work?

	Yes	No	Work doing at the time
Rash	_____	_____	_____
Chest pain	_____	_____	_____
Breathing problem	_____	_____	_____
Vision or eye problem	_____	_____	_____
Dizziness	_____	_____	_____
Headache	_____	_____	_____
Nausea	_____	_____	_____
Other (specify)	_____	_____	_____

List all substances to which you are exposed:

Name	Contents	Form (Gas, vapor, dust, other)	Form of exposure (Inhalation, skin, other)	Any symptoms from exposure (Eyes, skin, breathing, other)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

For each, comment upon:

	Letter(s)	Comments
Storage containers	_____	_____
Use containers	_____	_____
Ventilation	_____	_____
Label	_____	_____

B. Other Problems:

Are any of the following a problem on your job?

	Yes	No	Sources	Comments
Noise	_____	_____	_____	_____
Vibration	_____	_____	_____	_____
Heat	_____	_____	_____	_____
Cold	_____	_____	_____	_____
Sun	_____	_____	_____	_____

Sample History of Work-Related Injuries and Illnesses

Employee Name _____

Department _____

Date _____

Codes:

INJURY TYPE

- A - Broken bones
- B - Sprain
- C - Cuts
- D - Burns

ILLNESS TYPE

- E - Rash
- F - Breathing problems
- G - Vision or eye problems
- H - Headache
- I - Nausea
- J - Chest pains
- K - Hearing or ear problems
- L - Blood pressure problems
- M - Infection
- N - Exhaustion
- O - Other (specify)

CAUSES

- 1 - Traffic
- 2 - Vehicles
- 3 - Equipment
- 4 - Tools
- 5 - Lifting
- 6 - Ladders
- 7 - Fire
- 8 - Toxic substance
- 9 - Noise
- 10 - Heat
- 11 - Cold
- 12 - Stress

For each injury or illness you have suffered that may be job related, list:

Date	Injury or Illness Type	Cause	Specific Job You Were Doing at the time	Number of Work Days Lost
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Suggested Questions For An Accident Investigation Form

Accident Victim _____

Job Title _____

Date _____

Location _____

Sequence of Events

What time did the accident occur? _____

When did immediate supervisor arrive on scene? _____

When was First Aid administered? What type of First Aid was given? Was a First Aid kit on the worksite? When was an ambulance called? When did it arrive? _____

Did the worker return from the clinic/hospital the same day? If not, when? _____

Nature and Extent of Injury

What parts of the body were affected by machinery, material, hazardous substance? _____

Describe the extent of the injury (cuts, burns, broken bones, concussion, etc.) _____

Circumstances

What was the nature of the job being done at the time of the accident? _____

What types of machinery, tools, substances were being used? What condition were they in? _____

How many other workers were involved in doing the job? Were any of these hurt? _____

What preventive measures were taken in doing this job? _____

Had the worker been instructed in proper work procedures? If so, when? _____

Was the worksite set up properly? _____

Was the necessary personal protective equipment available and in use? _____

History

Have there been any previous accidents on this site? _____

If there were previous accidents, were records kept of these by the local, by DC 37, by the City agency? _____

The Labor-Management Health and Safety Committee

New York City law provides that each administrative agency or department must establish an agency-wide Labor-Management Health and Safety Committee. The Labor-Management Committee has the authority to resolve occupational health and safety problems. It provides an opportunity to discuss the health and safety hazards that affect you and your co-workers and to get management agreement to make necessary changes.

Evaluating the Committee

The Labor-Management Committee should be an effective forum for the Local's point of view. Your representative should be sure that:

- The Local and the Department have an equal number of members.
- The Local selects its representatives.
- The chairmanship and secretaryship rotate between the Local and the Department.
- Minutes are kept and agreements are written down.
- Both the Local and the Department make up the agenda and approve the minutes.
- There is a neutral procedure for breaking tie votes.



- The Local's representatives have access to all Department data such as monitoring, toxic materials, relative costs of safety and health materials and improvements, and workers' compensation records.
- The committee engages in joint activity such as:
 - frequent unannounced inspections;
 - review of Department policies that affect health and safety;
 - investigation of injuries, illnesses and accidents;
 - employee training about health and safety.
- Local representatives can meet independently during work hours.

Relation to Local Health and Safety Committees

The Local's representatives to the Labor-Management Health and Safety Committee must work closely with the

members of the Local's health and safety committees. They cannot visit all of the worksites in New York City and must rely on information that the health and safety committees gather from the workers in their area. Proposals made to management should be based on this input from you and your co-workers in the field. Similarly, information obtained by Joint Committee members, such as specifics on toxic substances or noise, should be given to all health and safety committees and then to all affected workers immediately.

Most importantly, the agreements won at the Labor-Management Committee will be meaningful only if they are enforced in the field. Letters of Agreement must be sent to each health and safety committee as soon as they are signed. The health and safety committees must make sure that the work materials, processes and conditions are changed to comply with the improved standards.

Using the Resources of DC 37

Some health and safety problems cannot be resolved at the shop or Local level. Or, you and your health and safety committee or representatives to the joint committee may need special information or backup. Your Local's membership in District Council 37 gives you access to assistance.

The officers, field representatives and staff at District Council 37 are available to help you achieve a healthy and safe workplace. They can work with you to provide:

Training and information. District Council 37 maintains an occupational health and safety library and conducts periodic training sessions and conferences that are available to all members. The Public Employee Press covers health and safety throughout the Council. Manuals and guidebooks cover specific problems.

Research. Specific hazards, their results and remedies can be chosen for intensive study, resulting in specific recommendations.

Collective bargaining. Health and Safety is a priority at the negotiating table and new rights can be won.

Legislative work. DC 37 works at federal, state and municipal levels and can obtain better laws regarding occupational health and safety, Workers' Compensation and disability.

Enforcement. The grievance procedure, arbitration, administrative agencies and the courts can be used to get compliance with the contract and the law.

DC 37 officers and staff responsible for health and safety must depend upon you for information. Use your Local officers and health and safety

committee to convey your thoughts to them.

Doing Research

In order to press for improvements in working conditions, your committee must be sensitive to changes in the workplace. It is very important to do continual research and keep records over time. Some basic areas of research include:

Accident Investigations

Very few "accidents" are really accidental. Most can be prevented by changing work processes or materials and by increased education and training of workers. One of the best ways to discover how future accidents can be eliminated, and their harmful effects reduced, is by studying the accidents that occur.

Reconstruction of events to understand conditions prior to and during the accident is usually the best way to conduct an accident investigation. It is very important that the on-site inspection occur soon after the accident and that the site of the accident is not disturbed. Advise your health and safety committee promptly that an accident has occurred. Where information might be lost, you and your co-workers can preserve it by taking photographs, making sketches and making notes or tape recordings.

All of the committee's findings should be recorded and submitted to the affected employees for comments. The Sample Accident Investigation Form included in this section can be used to make sure that the accident report is complete.

Workplace Survey

The committee should conduct regular workplace surveys to identify hazards, develop recommendations, and determine whether improvements are being made. When a health and safety committee visits your worksite, you should assist it.

The District Council 37 OSHA Project has developed an extensive health and safety survey form for road crews. It can be used to conduct a systematic and thorough survey of the health and safety hazards in your workplace.

Hazardous Substances Research

Many hazardous substances in the workplace go undetected because they are not labeled or labels do not include a chemical contents list. Before you can know what chemical hazards



you face, you must know the chemicals to which you are exposed.

Your health and safety committee should, by registered letter, demand a

listing of all chemicals and substances used on all worksites. The letter should specify that the list should include:

- The chemical or generic names of all materials (not trade or brand names).
- Their acute and chronic effects.
- The process(es) in which they are used and the levels at which they are present at each.
- Safe handling techniques.
- Engineering controls to be used.
- Personal protective equipment to be used.
- Emergency treatment procedures.

The letter should specify a date by which the list should be presented and

a method for updating it as substances change. Management may refuse to provide the list.

If management refuses, there are several means to obtaining the information:

- Local members can request the Labor-Management Health and Safety Committee to obtain the information.
- Trade names and the manufacturer's name and address can be obtained from labels and shipping cartons. Write to the manufacturer requesting a Material Safety Data Sheet. An example of one is shown here.
- File a grievance based on the

Local's need for the information.

- Have the Local's representatives to the Joint Committee negotiate a Letter of Agreement assuming your right to this information.
- Request that the National Institute of Occupational Safety and Health (NIOSH) conduct a health hazard evaluation.

Once you have the chemical names, you have to do research on whether they are hazards. To do this:

- Narrow down the list to a manageable number by deciding which create the worst problems for the most workers.
- Check to see if there is a legal

U.S. DEPARTMENT OF LABOR Occupational Safety and Health Administration				Form OSHA-201 Rev. 10-1-80	
MATERIAL SAFETY DATA SHEET					
Required under OSHA Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipyarding (29 CFR 1915, 1916, 1917)					
SECTION I - IDENTIFICATION					
MANUFACTURER'S NAME			EMERGENCY TELEPHONE NO.		
ADDRESS (Number, Street, City, State, and ZIP Code)					
CHEMICAL NAME AND SYNONYMS			TRADE NAME AND SYNONYMS		
CHEMICAL FAMILY			FUNCTION		
SECTION II - HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS		%	TLV	ALLOYS AND METALLIC COATINGS	
Pigments				Base Metal	
Catalyst				Alloys	
Vehicle				Metallic Coatings	
Solvents				Filled Metal	
Additives				Plastic Coatings or Resin Plastics	
Others				Others	
HAZARDOUS INGREDIENTS OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV
SECTION III - PHYSICAL DATA					
Boiling Point (°F)		Specific Gravity (H ₂ O=1)		Refractive Index	
Vapor Pressure (mm Hg)		Evaporation Rate (H ₂ O=1)		Flash Point (°F)	
Vapor Density (Air=1)		Solubility in Water		Appearance and Odor	
SECTION IV - FIRE AND EXPLOSION HAZARD DATA					
Flash Point (Hazardous)		Flammable Limits		LFL	
Extinction Media		Hazardous		LFL	
Special Fire Fighting Procedures					
Unusual Fire and Explosion Hazards					

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SECTION V - HEALTH HAZARD DATA			
THRESHOLD LIMIT VALUE			
EFFECT OF OVEREXPOSURE			
EMERGENCY AND FIRST AID PROCEDURES			
SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE	CONDITIONS TO AVOID	
INCOMPATIBILITY (Reactivity to Water)			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR	CONDITIONS TO AVOID	
WILL NOT OCCUR			
SECTION VII - SPILL OR LEAK PROCEDURES			
EVEN TO BE TAKEN IN CASE MATERIAL IS RELEASED BY USER			
WASTE DISPOSAL METHOD			
SECTION VIII - SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type)			
VENTILATION	LOCAL EXHAUST	GENERAL	
MECHANICAL (Specify)		OTHER	
PROTECTIVE GLOVES		EYE PROTECTION	
OTHER PROTECTIVE EQUIPMENT			
SECTION IX - SPECIAL PRECAUTIONS			
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE			
OTHER PRECAUTIONS			

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- maximum exposure level (TLV).
- Find the effects of overexposure, control mechanisms, and other information. (Books containing this information are listed in the Resource Section of this manual.)
- Draw conclusions about the hazards of the substance.

The researcher should keep careful notes in a file established for each chemical being studied. The file should be updated as soon as new information is learned.

Employer Organization

The health and safety committee should learn which management personnel are responsible for what operations, decisions and implementation. The questions they ask should include:

- All relevant paperwork should be filed.
- All files should be labeled to clearly identify their contents. Files may be on a specific item, for example "kerosene" or "fire extinguishers," on a specific complaint from a worker, for example, "Staten Island Shop," or others.
- All files requiring action should be identified as to whether they are open, pending or closed.

Information in files may be transferred onto Status Log Sheets. Status Log Sheets provide quick reference about patterns of injuries and illnesses and measures taken to correct hazards. Log sheets should be updated on a monthly basis. The Status Log Sheet shown here can give you an idea of how to develop one to suit your own committee's needs.

Educating Members

The effectiveness of your health

and safety committee's work depends on how much you and your co-workers know about health and safety in your workplace. The committee can coordinate the Local's health and safety education program. Educational tools that it can use include:

- Discussions at Local meetings, which may include films and experts from DC 37 and other organizations.
- Pamphlets and leaflets, which may be written by the committee or other groups.
- Reports on committee activities.
- Management training.

- Special seminars and conferences provided by colleges, the government, DC 37, the AFL-CIO or other organizations.

Making Recommendations for Improvements

Once health and safety hazards and ways to correct them have been identified, your health and safety committee can try to get management action. The Health and Safety Complaint form can be used to communicate concerns to management. A sample form is provided.

Local Safety and Health Sample Status List Log Sheet

DATE OF ENTRY	DESCRIPTION	CATEGORY	COMMITTEE SUGGESTIONS	MGT. COM.	MGT. ACTION	DATE OF ACTION	REQUIRED FOLLOW-UP
3/22/79	Improper back up vehicle in use for bus cut, Dept. of Traffic	B	Replace with appropriate truck—D truck instead of panel truck	Will correct problem	Replaced truck	4/19/79	None
4/30/79	Asbestos sprayed on beams of ceiling in lunchroom, locker room, shower room coming down. Maspeth shop, Dept. of Traffic.	A	Remove asbestos from ceiling	Will correct problem	Took bids from contractors; will correct situation.	5/21/79	Problem not yet corrected, s & h mtg. required.
5/15/79	Roof leaking, Bronx shop, 156th St, Dept. of Highways	C	Roof needs to be sealed	Will repair roof	Roof repaired	5/22/79	None
6/20/79	Rats in locker room, Kew Loop Dept. of Hwys.	B	Dept. should get exterminator	Will correct immediately	Exterminator sent out	6/22/79	None

- A: Immediate correction required.
 B: Requires attention as soon as possible.
 C: Hazard should be eliminated without delay, but situation is not an emergency.
 D: No hazard exists by determination of hazard committee.



Minimizing Effects of Hazards

You have all these ideas about how to make things better. That's fine. But what are we supposed to do in the meantime?

—An HR in Staten Island

Even if you could identify and work to correct all of the health and safety hazards on your job, it will take time to get changes made. In the meantime, you can reduce the bad effects of occupational injury and illness by acting promptly.

When you become injured or ill on the job, you suffer in two ways—physically and economically. The pain and disability of the injury or illness can be aggravated by loss of income. This chapter will help you to protect yourself from unnecessary hardship.

Minimizing Physical Effects

First Aid

First aid is the immediate care given to someone who has been injured or has suddenly become ill. Except where the injury is minor, first aid should be followed by adequate medical care as soon as possible. However, often no one with medical training is present at, or very close to, your worksite. Knowing first aid can save a life or prevent serious disability.

This section is *not* a detailed or sufficient course in first aid. It will introduce you to some basic principles and methods. You and your co-workers can take classes from a certified first aid instructor so that trained help is available to every road crew. The American Red Cross's detailed manual, *First Aid*, should be on every worksite.

First aid will be successful only if you know what you are doing. Prompt action often is required. Calm action always is required—if you panic, so will the victim. In preparing to carry out specific first aid measures, these procedures should be followed:

- Have someone telephone for necessary assistance such as police, ambulance, the department. Be prepared to give the exact location of the accident, the number of persons involved and, if possible, a telephone number at the site.
- Effect a prompt rescue.
- Ensure that the victim can breathe and give artificial respiration if necessary.
- Control severe bleeding.

Once emergency procedures have been taken, do the following:

- Loosen constricting clothing but do *not* pull on a belt in case of possible spinal injuries.
- Do *not* move the victim unless safety requires it.

- Use blankets or covers to prevent chilling. If the victim is wet or cold, put blankets or covers underneath as well as on top.
- Find out exactly what happened.
- Look for emergency medical identification such as a card, dogtag or bracelet.
- Identify all injuries or symptoms:
 - Open, remove or cut away clothing if necessary. Be careful not to create new injuries. Look for signs of wounds or fractures.
 - If a victim is unconscious, look for evidence of head injury.
 - If poisoning is suspected, check for stains or burns near the mouth and a source of poisoning near the site.

First aid measures to be taken depend on the specific problem:

Wounds and Bleeding

To stop profusely bleeding wounds, apply direct pressure with a clean cloth or bandage. Clean all wounds with soap and water. Then join edges with a band-aid. Stitches or suturing may be required.

Burns

First and second degree burns should be immersed in cold water (*not* ice water) until the pain subsides. In case of blisters, cover with dry sterile gauze or cloth. Do not use antiseptics on a severe burn.

Third degree burns are very serious—there is deep tissue destruction and a white or charred appearance. Do *not* remove stuck particles of clothing. Do *not* immerse in cold water or apply. Cover with sterile dressing. Take victim to hospital immediately. Keep burned feet, legs or face elevated. Keep burned hands above heart level.

Wash chemical burns with large amounts of water for at least 5 minutes

(15 minutes for eyes). Remove clothing from affected area. Treat as other burns.

Fractures

Immobilize the broken bone and adjacent joints. Elevate fractured arms or legs, if possible, without disturbing the fracture. Apply a splint—boards and belts can work in an emergency. Wait for ambulance.

Head, Neck and Back

DO NOT MOVE THE VICTIM.

Improper motion can cause permanent paralysis. Call for expert help.

Poisoning

GET MEDICAL HELP IMMEDIATELY. While you are waiting for help, call the poison center. You must be careful in taking action, because different types of poisons require different treatment. If

specific antidote is unknown and:

- If the victim has *not* swallowed a strong acid, strong alkali or petroleum product, dilute the poison with water or milk, induce vomiting, and get medical help.
- If the poison is unknown, look for burns around lips and mouth, odor of breath (such as gasoline), container label, unconsciousness, convulsions, exhaustion.
- If the cause is still unknown or is strong acid, strong alkali or petroleum product, dilute with water or milk and get medical help.
- If the victim is unconscious, exhausted or having convulsions, do *not* give medication or anything to drink and do *not* induce vomiting. Get medical help immediately. Keep victim quiet

and warm.

Electrocution

Remove current from electrical tool or apparatus by unplugging the tool, cutting off the electricity or similar methods. If this is not possible, attempt to knock the victim from the current by using only a *non-conducting* instrument. Treat as for shock or cardiac arrest (See below).

Heat Stroke

Take immediate measures to cool the body rapidly. These include removing clothing and sponging with cool water or rubbing alcohol; or applying cold packs; or placing in tub of cold water. Do not give stimulants. Once victim is cooled down, you can give sips of cool salt water.



Frostbite and Cold Exposure

Cover the frozen part; provide extra clothing and blankets; bring indoors immediately; give a warm drink. Rewarm the frozen part *quickly* by immersing it in warm, *not* hot water. Discontinue warming as soon as the affected part becomes flushed. Do *not*: rub the part, apply heat lamp or hot water bottles, break blisters.

Shock

Shock can be very serious and may be fatal if not arrested. The signs are shallow breathing, weak pulse, pale skin, cold clammy skin, dilated pupils, nausea, and even vomiting.

Keep victim lying down. The position will vary with the injury: If no head injury, place on back with legs elevated. If a head injury, elevate head and shoulders above the rest of the body. Cover loosely to prevent loss of body heat. Get medical help quickly.

Cardiac Resuscitation

If the victim lacks a heart beat, give cardiac resuscitation immediately. With sharp, brisk motions, push down on chest over the breast bone. Push from your shoulders and keep your arms straight. The ratio of chest pumps to breaths should be 3:1.

Artificial Respiration

Remove foreign matter from victim's mouth. Tilt victim's head backward so that the chin is upward. Pinch victim's nostrils shut with the thumb and index finger of your hand that is pressing on the victim's forehead. Blow air into victim's mouth—open your mouth widely, take a deep breath, seal your mouth on victim's and blow. Provide 1 breath every 5 seconds. When victim's chest is expanded, stop blowing, raise your mouth, turn your head to the side and

listen for exhalation. When chest falls, repeat the blowing cycle.

First Aid Kit

Your worksite should be equipped for emergency first aid procedures at all times. The minimum requirements include:

- 2 units—1" adhesive compress
- 2 units—2" bandage compress
- 2 units—3" bandage compress
- 2 units—4" bandage compress
- 1 unit—3" x 3" plain gauze pads
- 2 units—gauze roller bandage
- 1 unit—eye dressing packet
- 4 units—plain absorbent gauze ½ sq. yard
- 3 units—plain absorbent gauze 24" x 72"
- 4 units—triangular bandages 40"
- 1 unit—tourniquet, scissors, tweezers

Medical Screening

Many work-related diseases take a long time to develop to the point where you suffer symptoms. Or you may suffer from symptoms of an occupational illness that your doctor does not connect to your job. Even seemingly minor symptoms such as frequent headaches after work or at work, eye irritation, rashes or burning skin, trouble breathing at work—especially if there is no problem at home—can be signs of a serious medical problem.

Medical screening can identify work-related diseases before it is too late. Most doctors know little about the health effects of workplace conditions. You may have to educate your doctor about your working conditions so that she or he can help you.

A medical examination should always include these procedures:

Occupational history. The chemicals and materials to which you

have been exposed *throughout* your working life can affect your health, even years after you have stopped using them. Tell your doctor in detail about all jobs and exposures you have had. An Occupational Health History form can make sure all information is complete and organized.

Specific laboratory exams. Specific blood and urine tests can detect damage to liver, kidneys and heart by toxic chemicals. Other blood and urine tests detect the presence of specific chemicals, such as benzene, carbon monoxide, chromium, lead and toluene in your system. Make sure you are tested for the specific chemicals to which you are exposed.

Lung function tests. Damage to your lungs from dusts, vapors and gases can be measured with a lung function test. It may reveal damage before you feel sick and before an x-ray looks abnormal. New workers should have a pre-employment test to establish a reference point.

Patch tests. Patch tests are skin tests that can determine whether you are allergic or have a special sensitivity to specific substances.

Audiograms. An audiometric test will show how much hearing loss you have suffered. New workers should have an audiogram done. It will serve as a reference point and help prove that any later hearing loss was caused by the job. An audiogram should be done at least once a year. It is important to have been away from a noisy environment for more than 4 hours before taking the test.

Your doctor can obtain several excellent reference books on the diagnosis and treatment of occupational disease from NIOSH. The OSHA Project has a good list. Be sure that your doctor is prepared to meet your medical needs.

OCCUPATIONAL HEALTH HISTORY

OCCUPATIONAL PROFILE

Fill in the table below listing all the jobs you have had (even short-term, seasonal, and part-time) starting with your present job and going back to the first. Use additional paper if needed.

Workplace/Address	From	To	Type of Industry/Firm	Description of Job	Known Health Hazards

Residences—Please list all places you have lived starting with your current home.

City	State	Rural	Urban	Suburban	Duration (mos/ysr.)	Known or Suspected Hazards

What is your present occupation?

Kind of business _____

Kind of work done _____

To your knowledge, are you exposed to any hazardous substances—fumes, dusts, solvents, minerals, mists, chemicals, or gases—in the course of your work? Yes No

If yes, please detail _____

Were you given a pre-employment physical? Yes No
 Are you given periodic health examination at work? Yes No

*If yes, which kind? (Please circle)

Blood samples Eye exam Physical exam X-ray (Type) _____
 Blood pressure Hearing test Breathing test Other _____

*How often are you tested? _____

Do you wear any protective devices in your work? Yes No

If yes, is it mandatory? _____ Optional _____ Was it pre-fitted? Yes No

Did you have an exam prior to being given the device? Yes No

Please describe the device you wear. _____

Have you ever to the best of your knowledge worked at a job handling any of the following materials? Yes No

Aerosols	Coal Tar and	Methyl Ethyl Ketone
Ammonia	Fractions (Pitch,	(MEK)
Anesthetic gases	Creosol, Creosote,	Methylene Chloride
Asbestos	Acridine, Anthracene)	Paints
Asphalt and Tar	Cotton	Pesticides/Fungicides
Benzene	Crop Dust & Sprays	Plastics
Beryllium	Dioxane	Powders
Calcium Oxide (Lime)	Dusts	Silica (Sand Quartz)
Carbon Disulfide	Dyes & Stains	Silicates
Carbon Monoxide	Epoxy Resins	Solvents
(Exhaust Fumes)	Fiberglass	Tobacco Leaves
Cement (Portland	Gasoline & Oil	Toluene
Cement)	Lead	Turpentine
Chromates	Mercury	Welding Fumes
Coal	Methyl Alcohol (Carbinol, Wood	X-Ray or Radioactive Materials
	Spirits, Wood Alcohol, Methanol)	

Other _____ None _____

Have you had any health problems connected with your current job? Yes No

If yes, describe _____

Have you ever worked in these major industries or occupations?

Auto repair	Construction	Electronic	Mining	Petroleum	Sand blaster
Brake lining	Demolition	Farming	Office worker	Pipefitter	Sawmill
Carpentry	Digging	Foundry	Operating room	Plastics	Shipyards
Chemicals	Dry cleaning	Hairdresser	Painter	Printer	Welder

Have you ever worked at any other dusty jobs? Yes No

If yes, please detail _____

Have you ever been exposed regularly to any type of irritating gas? Yes No

Chemical? Yes No Noise? Yes No

If yes, please detail _____

Have you ever changed occupations because of a health problem at work? Yes No

If yes, please detail _____

Have you ever changed a task assignments within the same industry or place of work because of a health problem? Yes No

If yes, please detail _____

Smoking History (To identify number of pack years: packs per day times number of years)

Do you now smoke cigarettes? (Circle one)

regularly/occasionally (usually less than one cigarette each day)/never.

If you smoke cigarettes regularly now:

Do you inhale? Yes No

Do you smoke cigarettes with filters _____ without filters _____ or both _____?

How many cigarettes do you usually smoke each day at the present time? Please give best estimate; (one pack contains 20 cigarettes) _____ number of cigarettes per day.

How old were you when you began to smoke cigarettes? _____ (age)

If you do NOT smoke cigarettes now, did you ever smoke them regularly or occasionally? (Circle one) Yes No

What was the usual number of cigarettes you smoked per day? Please give best estimate; (one pack contains 20 cigarettes) _____ number of cigarettes per day.

Did you inhale? Yes No

How old were you when you began to smoke? _____ (age)

How old were you when you stopped smoking cigarettes regularly _____ (age)

Why did you stop? (circle one) cough/wheezing/shortness of breath/other _____

Do you now smoke pipes or cigars? (Circle one) regularly/occasionally/never.

If you smoke pipes or cigars regularly now:

How many pipefuls or cigars do you usually smoke each day? _____ number per day.

How old were you when you first smoked? _____ (age)

Do you usually inhale when you smoke either pipes or cigars? Yes No

Medical History

Have you ever had any of the following symptoms? Oral/Nasal/Throat

General

weight loss
weight gain
fatigue/weakness
night sweats

Stress

irritability
depression
difficulty sleeping

Neurological

seizures
fainting
paralysis
frequent headaches
loss of memory
numbness or tingling
dizziness
stroke
tremor
loss of taste or smell

Skin

psoriasis
eczema
dermatitis
redness
itching/sore
dry/burning
pimples or blackheads
color changes or blotches
lumps/cysts/growths
change in mole size/shape
blistering
hair loss
boils/infections
discoloration of fingers
nail changes/color changes

Ear

buzzing/ringing
sores/frequent infections
loss of hearing

Eye

require glasses/vision worse
glaucoma
cataracts
pain/burning/redness/tearing
frequent blinking
blurry vision
particles or chemicals in eye

excess salivation
sores on lip, tongue/mouth
frequent sore throat
bleeding gums
dental problems
objects in mouth on job
other

Cancer

told you had a form of cancer

Endocrine

diabetes
thyroid disease
take hormones
other

Pulmonary

hay fever
asthma
frequent wheezing
chest tightness
chronic cough
emphysema
pneumonia
cough up phlegm
shortness of breath
breathing more difficult
as work progresses
cough up blood
tuberculosis exposure
treated for tuberculosis
get out of breath more easily
than people of same age

Cardiac

heart attack
chest pain
heart murmur
high blood pressure
irregular/rapid heart rate
feet/legs swell
pain in legs walking
difficulty breathing while
lying flat

Gastrointestinal

ulcer
hepatitis (jaundice)
liver disease
vomit blood
black tarry stools

change stool size
diarrhea
abdominal pain
gas or bloating
constipation
blood in stools

Genitourinary

frequent urination
burning urination
involuntary urination
change color/smell
kidney stones
urinary infection
blood in urine
other kidney disease
other

Blood/Immunological

anemia
problems with easy bleeding
frequent colds/flu
cuts/sores heal slowly
frequent skin infections
frequent pneumonia

Joints/Orthopedic

arthritis
back pain or injury
joint stiffness
stiff neck
shoulder aches
foot pain
swollen joints
wrist pain
tender or sore arms/legs

Reproductive

Men
difficulty achieving/
maintaining erection
unable to achieve
pregnancy with partner
Women
difficulty becoming pregnant
miscarriage
menstrual irregularity
heavy flow
sore breasts
discharge from nipples
discharge from vagina
mass/lump in breasts
frequent vaginal infections

Minimizing Economic Effects

include:

- Medical expenses for as long as necessary.
- Compensation equal to two-thirds of your average weekly wage, up to a maximum of \$215 a week (as of January 1, 1979) for total disability to work resulting from the injury or illness.
- Cash death benefits to your spouse and children in case of death resulting from job-related injury or illness.

What To Do If You Are Hurt

Following these procedures will help you to obtain the maximum benefits to which you are entitled:

Get first aid or other medical treatment immediately. You can be treated by any doctor, chiropractor, osteopath, podiatrist or dentist who is approved by the Compensation Board. *Be sure to tell the doctor that you were injured on the job.* The doctor has to complete a C-4 form and forward it to the Workers' Compensation Board and the City of New York Law Department, Workers' Compensation Division. (Please refer to Resource List for exact address.) You should not have to pay; under the laws, the City should pay medical bills directly to your doctor.

Inform your supervisor of your job-related injury or illness immediately. The employer must complete an Employer's Report of Injury (C-2 form) and send it to the City Law Department.

Obtain a Notice of Injury from (WCD-23) from your agency as soon as possible. Complete it and return two copies to your agency immediately. *You must return it within 30 days of the injury.* Make a copy for your files and be sure to get a receipted copy back from the agency.

Complete a C-3 Workers' Compensation Claim Form (Employees' Claim for Compensation). Note that the best answer to Item 6 is simply "working." Always answer "yes" to Item 3—you do *not* have to explain your answer even though the form requests an explanation.

You may file a disability form with DC 37's Health and Security Plan. A person collecting Workers' Compensation may not collect DC 37 Health and Security Plan disability or catastrophic benefits for the same injury or illness. However, you should file before you begin receiving benefits and you believe you will be away from work for several months. This will protect your benefits (such as drugs, dental, optical and life insurance) for a limited time.

It is advisable to get expert legal advice as soon as possible after your accident. You can get accurate information and help in filling out the forms. You have a right to choose your own Compensation legal representative. Members who ask the union to recommend an attorney are referred to Levidow & Levidow, 291 Broadway, New York, NY 10007, 964-3290. They will furnish advice on forms, procedures, and answers to technical questions at no cost to members. If you use another attorney, the fee, if any, is set by the Workers' Compensation Law and is deducted from your award.

Continue medical assistance as long as you need it. Go back to work only when you feel you are able to work without further injury or illness and when you have your doctor's okay.

What To Do If You Lose Work Days

If your work-related injury or illness keeps you from working, you can

Workers' Compensation

District Council 37 has issued a short guide to Workers' Compensation. You should obtain a copy and read it before you need to apply for Workers' Compensation. This section, which is based on that pamphlet, is a brief introduction to the area.

What the Law Provides

Most New York City employees are covered by New York State Workers' Compensation Law. The basic principle is that if you are injured at work or suffer a disease as a result of your job, you are entitled to benefits which may

continue to receive wages. You may choose:

To use your sick or leave time. While you are out, your agency will pay you full salary from your first day of absence. If you are awarded Workers' Compensation, the Board will enable the City to restore the used time to your leave bank at the same rate that the law provides for cash payments. When you are notified that the award calls for reinstatement of time, be sure to notify your payroll department immediately.

To receive compensation payments. The City usually takes quite a while to start making payments. Therefore, most people do not choose this option.

If you have no leave time in your bank, or not enough to cover all the days you are off the job, the DC 37 contract provides for additional sick leave with pay. (City-Wide Contract, Article V, Time and Leave Rules.)

The contract also describes special leave provisions for employees who are physically disabled because of an assault suffered in the course of employment (City-Wide Contract, Article V, Section 10).

Workers' Compensation is Not an Open and Shut Case

The City may dispute your claim and refuse to pay. You have a right to defend your claim and to use expert legal representation. The dispute usually ends in a hearing where both sides present their evidence and arguments.

Both the City and you have the right to appeal the decision that results from the hearing. You must file your appeal within 30 days of the original decision.

You have the right to apply for a reopening of your case under certain

CITY OF NEW YORK EMPLOYEE'S NOTICE OF INJURY (Pursuant to §19 of Workers' Compensation Law)

FORWARD TO: LAW DEPARTMENT, WORKMEN'S COMPENSATION DIVISION
Room 1233 — 250 Broadway, New York, N. Y. 10007

(TOGETHER WITH C2 WHEN POSSIBLE)

ANSWER ALL QUESTIONS FULLY. THIS IS YOUR NOTICE TO YOUR EMPLOYER OF INJURY ON THE JOB. PRINT OR WRITE LEGIBLY.

1. Full name of injured person. JOHN J. SMITH
(First) (Middle) (Last)
2. Address 800 West 49 Street, New York, N. Y.
3. Name of employer CITY OF NEW YORK—DEPARTMENT OF Parks
4. Date of accident August 1, 1979 Hour 9 AM PM
5. Exact location where accident happened Central Park in zoo area
6. How did accident happen? (describe fully) I cut my hand on jagged piece of metal
7. Nature and extent of injury laceration of my right hand
8. Did you inform your superior of this accident? Yes Date? Day of accident
Name such person John Jones
9. Names and addresses of witnesses Howard Brown and Ronald White, co-employees

Dated August 1, 1979

(Sign here)

John J. Smith

THIS IS NOT A CLAIM FORM. A CLAIM FORM MAY BE SECURED AT ANY OFFICE OF THE STATE WORKMEN'S COMPENSATION BOARD.

STATE OF NEW YORK
WORKERS' COMPENSATION BOARD

EMPLOYEE'S CLAIM
FOR COMPENSATION

PLEASE PRINT OR TYPE

Social Security Account Number

WCB Case No.

Carrier
Case No.

015688 9786

ANSWER ALL QUESTIONS FULLY

Injured Person

1. Name JOHN J. SMITH

2. Address 800 West 49 Street, New York, N. Y. 10019

3. Sex Male Age 45 Married or single Married

4. Do you speak English? Yes If not, what language do you speak?

5. State what your regular work was Park Attendant

6. What were you doing when you were injured? Working

7. Wages or average earnings per day, including overtime, board, rent and other allowances \$ 10.00

8. Were you paid full wages for the day of injury? No

9. Were you at the time of injury a piece worker? No

Or a time worker? Yes

10. Your work week, at time of injury was (check one) X 5 day 6 day 7 day

Employer

1. Name of your employer C.N.Y. - Dept. of Parks Telephone No.

2. Employer's address The Arsenal, Central Park, New York City, N. Y.

3. Nature of employer's business

Place and Time

1. Address and county where injury occurred Central Park in zoo area, New York City

2. Name of foreman John Jones

3. Date of injury, the 1st day of August, 1979, at 9 o'clock A. M.

The Injury

1. How did injury occur? I cut my hand on a jagged piece of metal.

Nature and Extent of Injury

1. State fully nature of your injury Laceration of my right hand.

2. On what date did you stop work because of this injury? August 1st, 1979

3. Have you returned to work? Yes If "Yes", on what date August 4th, 1979

4. Does injury keep you from work? No Yes X No

5. Have you done any work during period of disability? Yes If "Yes", for what

6. Have you received any wages since your injury? Yes After I returned to work.

and at what rate? Same as before (check one) X Hourly Daily Weekly

7. Has injury resulted in amputation? No If so, describe same

Medical Records

1. Did you receive medical care? Yes X Yes No

2. Are you now receiving medical care? No Yes X No

3. Are you now in need of medical care? No Yes X No

4. Have you requested your employer to authorize medical care? No Yes X No

5. Name and address of attending doctor Dr. Carl Phillips, 21 west 49 Street, New York City

6. If you were in a hospital give its name and address

Workers' Compensation Payments

1. Have you received workers' compensation payments for the injury reported above? No Yes X No

2. Are you receiving workers' compensation payments? No Yes X No

3. Do you claim further workers' compensation payments? Yes X Yes No

If "Yes", explain For possible limitation of motion of my right hand.

Notice

1. Have you given your employer (or foreman) notice of injury? Yes X Yes No

If "Yes", such notice was given to (Name) John Jones on August 1, 19 79

2. Was notice given orally or in writing? orally and in writing

I hereby present my claim to the Chairman, Workers' Compensation Board, for compensation for disability resulting from an accidental injury or occupational disease arising out of and in the course of my employment and not occasioned by my willful intention or solely through intoxication, and in support of it I make the foregoing statement of facts.

Dated August 16, 1979

Signed by John J. Smith

Mail Address

City Telephone No.

State Zip Code Apt. No.

(SEE OTHER SIDE FOR IMPORTANT INFORMATION)

C-3

C-3

C-3

C-3

C-3

THE WORKERS' COMPENSATION BOARD EMPLOYEES AND SERVES THE HANDICAPPED WITHOUT DISCRIMINATION.

circumstances, even if all benefits originally awarded have been paid. Your case may be reopened if: (1) your medical condition or degree of disability due to the job related injury or disease have gotten substantially worse; and (2) the application is within 18 years of the original case.

Your City health insurance coverage will be discontinued when you have used up all the leave time to which you are entitled or when you are no longer receiving a City paycheck. You can apply for a direct payment policy from the health insurance company to continue coverage.

Additional Economic Relief Federal Benefits

If you expect your disability to continue for a year or more, and you are covered by federal Social Security, you may be entitled to Federal Disability Insurance Benefits.

You should apply for Disability benefits at your Social Security office as soon as you expect to be disabled for more than a year. Application should be made before a year has passed from the onset of the disability.

Third-Party Lawsuits

You are not permitted to sue the City for your job-related injury or illness. Workers' Compensation satisfies the City's obligation regardless of the extent and severity of your disability.

However, you may sue a third party if that party is responsible for the injury or illness. For example, a private landowner, automobile owner or driver, or a product manufacturer are subject to being sued. You should consult a lawyer who specializes in Workers' Compensation and personal injury if you believe you could possibly have a third-party lawsuit.

Resource List

This manual is just a beginning in your education about work-related health and safety. You will need more information and assistance to identify and correct the hazards on your job. The following is a list of publications, schools, libraries and organizations that you can consult to learn more and get help.

Publications

These publications were used in the preparation of this manual. They are part of the DC 37 OSHA Project's library and are available for your use.

Traffic

Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration, U.S. Government Printing Office, 1978.

Traffic Controls in Construction and Maintenance Workzones, U.S. Department of Transportation, Federal Highway Administration, U.S. Government Printing Office, 1979.

Traffic Control for Street and Highway Construction and Maintenance Operations, Instructor Guide, U.S. Department of Transportation, Federal Highway Administration, U.S. Government Printing Office, 1978.

Manual of Uniform Traffic Control Devices, New York State Department of Transportation, Traffic and Safety Division, 1974 (and revisions).

Traffic Safety Manual, New York State Thruway Authority, 1977.

Regulation Manual on Temporary Traffic and Pedestrian Control by Street Barricades and Channelization, Department of Traffic, City of New York, 1969.

Barricades and Warning Devices for Highway Construction Work, National Safety Council, Data Sheet 239, 1974.

- Air Powered Hand Tools*, National Safety Council, Data Sheet 1-392-78, 1978.
- Portable Reamer Drills*, National Safety Council, Data Sheet 497, 1969.
- Grounding Electric Shovels, Cranes and other Mobile Equipment*, National Safety Council, Data Sheet 287, 1954.
- Grounding of Portable Electric Equipment*, National Safety Council, Data Sheet 299, 1954.
- Ground-Fault Protection on Construction Sites*, U.S. Department of Labor, OSHA, 1977.
- Portable Ladders*, National Safety Council, Data Sheet 665, 1977.

Fire

- Working with Flammable and Combustible Liquids*, U.S. Department of Health, Education and Welfare, NIOSH, 1978.
- Emergency Action Guide for Selected Hazardous Materials*, U.S. Department of Transportation, 1978.
- Fire Prevention and Control on Construction Sites*, National Safety Council, Data Sheet 491, 1977.
- Cleaning Small Containers That Have Held Combustibles*, National Safety Council, Data Sheet 1-432-78, 1978.

Hazardous Substances

- Toxic Substances Regulated by OSHA: A Guide to Their Properties and Hazards*, Labor Occupational Health Program (LOHP), 1978.
- A Guide to the Work Relatedness of Disease*, U.S. Department of Health, Education and Welfare, NIOSH, 1979.
- Occupational Diseases—A Guide to Their Recognition*, U.S. Department of Health, Education and Welfare, NIOSH, 1977.
- Chemical Hazards of the Workplace*, Proctor & Hughes, J.B. Lippincott, 1978.
- Common Toxic Substances and Their Effects*, UAW Social Security Department, 1978.
- Essentials of Materials Handling*, U.S. Department of Labor, OSHA, 1975.
- Miscellaneous Chemical Products*, U.S. Department of Health, Education and Welfare, NIOSH, 1977.
- Asbestos Dust*, Fowler, Western Institute for Occupational/Environmental Sciences, Inc. (WIOES), 1979.
- Criteria for A Recommended Standard—Occupational Exposure to Asphalt Fumes*, U.S. Department of Health, Education and Welfare, NIOSH, 1977.

- Criteria for a Recommended Standard—Occupational Exposure to Carbon Monoxide*, U.S. Department of Health, Education and Welfare, NIOSH, 1972.

Health Effects of Exposure to High Concentrations of Automotive Emissions, Studies in Bridge and Tunnel Workers in New York City, Ayers et. al, Architecture Environmental Health, September 1973.

Carboxyhemoglobin Levels Due to Traffic Exhaust, de Bruin, Architecture Environmental Health, September 1967.

Health Hazards of Chromate Pigments and Paints, U.S. Department of Labor, OSHA, 1979.

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Use of Hydrofluoric Acid as An Aluminum Brightener and Cleaner, U.S. Department of Labor, OSHA, 1979.

Lead, U.S. Department of Labor, OSHA, 1975.

Respiratory Protection—A Guide for the Employee, U.S. Department of Health, Education and Welfare, NIOSH, 1978.

How to Select Proper Hand Protection, National Safety News, May 1979.

Emergency Eye Wash Units and Drench Shower Stations, National Safety News, May, 1979.

National Safety Council Data Sheets on:

- Vapor Degreasers, #429, 1975.
- Hydraulic Fluids, #1-471-78, 1978.
- Asphalt, #215, 1965.
- Benzene, #308, 1970.
- Bituminous Pavement Patching and Repairing, #647, 1974.
- Lead, #443, 1975.
- Lime, #1-24-74, 1974.
- Methylene Chloride, #474, 1959.
- Paving with Portland Cement Concrete, #541, 1972.
- Sulfuric Acid, #325, 1970.
- Turpentine, #367, 1975.
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Noise

Work is Dangerous to Your Health, Stellman and Daum, Vintage 1973, Chapter Four.

Weather

Work is Dangerous to Your Health, Stellman and Daum, Vintage 1973, Chapter Five.

Occupational Disease, NIOSH, 1977, Section 6.

Health and Safety Committees

Organizing a Safety Committee, U.S. Department of Labor, OSHA, 1975.

A Guidebook for Local Union Health and Safety Committees, Fowler, Labor Occupational Health Program (LOHP), University of California, 1974.

A Worker's Guide to Documenting Health and Safety Problems, Davis, Labor Occupational Health Program (LOHP), University of California, 1978.

How to Look at Your Workplace, Urban Planning Aid, Inc. 1976.

Teaching Safety and Health in the Workplace, U.S. Department of Labor, OSHA, 1976.

IAM Guide for Safety and Health Committees. International Association of Machinists and Aerospace Workers, Washington, D.C.

Labor-Management Health and Safety Committees

Regulating Occupational Hazards Through Collective Bargaining, Bacow, U.S. Department of Commerce, 1978.

Major Collective Bargaining Agreements: Safety and Health Revisions, U.S. Department of Labor, OSHA, 1978.

Collective Bargaining for Occupational Health and Safety, Foyer, LOHP, University of California, 1973.

UAW-GM National Agreement, Memorandum of Understanding Health and Safety, United Auto Workers, Detroit, 1978.

Proposed Revised Health and Safety Clauses for 1979 OCAW Chemical Bargaining Policy, Oil, Chemical and Atomic Workers, Denver, 1979.

Minimizing Effects

Workers' Compensation, District Council 37, AFSCME, AFL-CIO, 1979.

Standard First Aid and Personal Safety, The American Red Cross, 1977.

General

Health and Safety Guide for Highway and Street Construction, U.S. Department of Health, Education and Welfare, NIOSH, 1978.

Work is Dangerous to Your Health, Stellman and Daum, Vintage, 1973.

Safety Manual, Highway Maintenance Subdivision, State of New York, Department of Transportation, 1976.

Public Employee Safety Guide for Street and Highway Maintenance, National Safety Council, 1974.

Occupational Health and Safety, A Manual for Foundry Workers, Bertinuson and Weinstein, LOHP, University of California, 1976.

National Safety Council Data Sheets on:

Preparation, Erection and Maintenance of Traffic Signs and Highway Markers, #659, 1976.

Pavement Marking of Streets, Roads and Highways, #643, 1974.

Snow Removal & Ice Control on Highways, #638, 1973.

Trench Excavation, 1-254-77, 1977.

District Council 37, AFSCME Resources

Safety and Health

140 Park Place, Room 814
New York, NY 10007.
766-1562

If you and your safety and health committee have a safety and health problem, you can contact your rep for assistance. Health and Safety compliance staff are also available to inspect your workplace and to answer complaints. Other safety and health information is available from the OSHA Project. You can contact both compliance staff and the OSHA Project at 766-1562.

Medical

DC 37 Med-Plan

Information: District Council 37
140 Park Place, 8th Floor
New York, NY 10007
766-1791

Center: Bellevue-New York University Hospital
450 First Ave. (26th Street)
New York, NY 10010

Legal

Municipal Employees Legal Services Plan
365 Broadway
New York, NY 10013
334-1200

Workers' Compensation

Levidow & Levidow
291 Broadway
New York, NY 10007
964-3290

City of New York
Law Department
Workers' Compensation
Division
100 Church Street
New York, NY 10007

Personal Counseling

Personal Services Unit
District Council 37
140 Park Place, Room 408
New York, NY 10007
766-1927

Organizations

The following organizations handle requests for information about safety and health problems, provide educational materials, conduct workshops, hold safety and health conferences, and have research libraries open to the public.

New York Committee on Occupational Safety and Health (NYCOSH)

5 Beekman Street, Room 628
New York, NY 10038
349-6478

Center for Occupational Hazards

5 Beekman Street, Room 628
New York, NY 10038
227-6220

Labor Safety and Health Institute (LSHI)

377 Park Avenue South, 3rd Floor
New York, NY 10017
689-8959

Women's Occupational Resource Center

American Health Foundation
320 E. 43rd Street, 4th Floor
New York, NY 10017
953-1900

Montefiore Hospital & Medical Center

Department of Social Medicine
111 E. 210th Street
Bronx, NY 10467
920-4625 or 920-4766

Libraries

In addition, the following institutions have technical reference material about safety and health.

NY Academy of Medicine
2 E. 103rd Street
New York, NY 10028
876-8200

New York Public Library

Science Department
5th Avenue and 42nd Street
New York, NY 10018
790-6578

NYC Municipal Reference and Research Center

General Services Administration
Municipal Building
1 Centre Street, 22nd Floor
New York, NY 10007
566-2616

Schools

The following educational institutions offer courses or programs in occupational safety and health. Because safety and health is a new field, the content of these programs is continually expanding. Consult each one individually to find out what their current program is offering.

Cornell University—NYSSILR

Occupational Safety and Health Program
3 East 43rd Street
New York, NY 10017
599-4593

Hunter College

Environmental Health Science Program
NYU Medical Center
1st Avenue & 30th Street
New York, NY 10016
481-5115

Hofstra University

DC 37 Campus
140 Park Place
New York, NY 10007
766-1839

The following institutions grant professional degrees in various occupational health specialties:

Occupational Safety

Center for Safety

New York University
Washington Square
New York, NY 10003
598-2156

Occupational Hygiene

Hunter College, CUNY
School of Health Sciences
New York University Medical Center
550 First Avenue
New York, NY 10016
679-3200

Occupational Health Nursing

School of Nursing
College of The City of New York
138th Street and Convent Avenue
New York, NY 10037
690-4265

Occupational Medicine

Environmental Sciences Laboratory
Mount Sinai School of Medicine
One Gustave L. Levy Place
New York, NY 10029
650-6422

CMDNJ—Rutgers Medical School
Department of Community
Medicine
University Heights
Piscataway, NJ 08854
(201) 463-4500

Sophie Davis School of
Biomedical Education
CCNY
138th-St & Convent Avenue
New York, NY 10038
690-8224

Public Health

Columbia University
School of Public Health
600 West 168th St
New York, NY
694-3927

Government Agencies

Public employees do not have the same legal protection for their safety and health as employees in the private sector. If you want more information about the legal protections that are available, contact the OSHA Project.

If a friend or member of your family works for the private sector, they are covered under OSHA. If they suspect

that they are exposed to a hazardous substance on their job, they can request a Health Hazard Evaluation from:

National Institute for Occupational Safety & Health
(NIOSH) US Department of HEW
26 Federal Plaza, 33rd Floor
New York, NY 10038
264-4040

If they would like to have their workplace inspected because of unsafe and unhealthful conditions, they can request an inspection by contacting:

Occupational Safety and Health Administration (OSHA)
US Department of Labor
Region 2
1515 Broadway, Room 3445
New York, NY 10036
944-3424

If they are retaliated against by their employer as a result of filing an OSHA complaint, they can complain to:

OSHA Regional Office (Region 2)
1515 Broadway, Room 3445
New York, NY 10036
944-3424
National Labor Relations Board (NLRB)
26 Federal Plaza
New York, NY 10038
264-0300

Glossary

Absorption	The passage of a substance into the body through the skin.
Acclimatization	The process of becoming accustomed to a new environment. Example is the amount of time necessary for the body to become used to working in a hot or cold environment.
Acute	Illnesses or reactions that occur immediately upon exposure. They are severe, they are usually over quickly, lasting only minutes, hours, days or at most a few weeks.
Administrative controls	A method of reducing exposure to hazards by which changes are made in the division of labor in a work process; for example, rotating workers through the most hazardous jobs; lengthening break time or rest periods when doing hazardous jobs. This method limits exposure, but does not eliminate it.
Aerosols	Also called particulates; a suspension of fine solid or liquid particles in gas; examples are smoke, fog, mist, insecticides, cosmetics.
Alkali	Any of the compounds which form soluble soaps with fatty acids to form a soluble carbonate. Examples are ammonia and caustic soda.
Audiogram	A test which measures hearing ability.
Carcinogen	A substance that causes cancer.
Cardiac resuscitation	The process of restoring breathing and heart beat through artificial respiration or through the use of cardiopulmonary resuscitation (CPR).
Chronic	Diseases which come from repeatedly being exposed to doses of irritating substances over a long period of time.
Conjunctivitis	Overexposure of the eyes to a substance (such as sunlight) which causes the mucous membranes to dry out and which can cause a change in the structure of the eye.
Compensation benefits	A weekly cash benefit for job related illness or injury. Compensation pays 2/3 of your average weekly wage up to a maximum of \$215 for a total disability.
Contaminant	A substance that creates a harmful hazard when it comes in contact with the environment. Example is radiation.
Decibel (dB)	A number which measures sound pressure or loudness. Every increase of 10 decibels means an increase in loudness of 10 times. 100 decibels is 10 times louder than 90 decibels; 90 decibels is 10 times louder than 80 decibels; 100 decibels is 100 times louder than 80 decibels.

Disability benefits	A weekly settlement for disability or illness which comes from non-job-related causes. The maximum disability benefits are \$95 under state law, and they last for 26 weeks. DC 37 maximum disability benefits are \$115.
Engineering controls	A method of reducing exposure to hazards by which changes are made in the design of machinery or the plant; or where a work process is enclosed or isolated; or where a less hazardous substance is substituted for a more hazardous one. Engineering controls are the most effective means of eliminating hazards (see administrative controls and personal protective devices for other types of controls).
Fibers per cubic centimeter (Fibers/cm³)	The particles of a substance which are large enough to be measured in cu. cm. Often used for measuring asbestos.
Generic	The name of a substance not protected by a trademark which usually describes its chemical structure. Calcium oxide is a generic name. Lime is its trade name. Portland Lime is a brand name.
Habituation	To become accustomed to with frequent, repeated exposure, as to cold.
Hazardous	Involving or exposing yourself to a risk by handling harmful materials.
Ingestion	The passage of a substance into the body by way of the mouth.
Inhalation	The passage of a substance into the body by breathing it into the lungs.
Irritant	A chemical that damages the skin directly is called a primary irritant. These substances penetrate the normal outer barriers and injure the lower skin layers. Strong acids and alkalies, and many oils are examples of strong primary irritants for everyone. All people exposed to the same concentration of these substances will have an identical skin irritation.
Local	Restricted to or pertaining to one spot or part of the body; not a general condition.
Lower explosive limit (LEL)	Sometimes called lower flammable limit (LFL); the minimum amount of a gas or vapor which will burn in air. Example is the LEL of gasoline: 1.4% in air.
Lung function test	A test which measures the ability of the lungs to do their job of bringing oxygen into the body and exchanging it for carbon dioxide. Some of these tests measure how freely air flows into and out of the lungs; others measure how well air crosses into the blood.

**Milligrams per
cubic meter
(Mg/m³)**

**Occupational Safety
& Health Act
(OSHA)**

A measurement of the weight of a material in proportion to the volume of air samples. Used for dusts, vapors, gases.

The first piece of national federal legislation protecting workers from safety and health hazards on their jobs. The Act, passed in 1970, covers about 60 million workers in over 5 million workplaces in the U.S. The Act does not cover federal, state, county or municipal employees. However, under one of the provisions of the law, a state can set its own standards for safety and health in the workplace, provided they are at least as effective as the federal standards. Some states have done this, and a few have allowed public employees to be covered in them. At this time, no attempts to have a New York State OSHA have passed in the state legislature.

**Particulates
Parts per million
(PPM)**

See aerosol.

Parts of vapor or gas to other contaminant per million parts of air by volume.

Patch tests

Skin tests used to determine allergies or sensitivity to specific substances by applying a small amount of the substance on a patch of skin.

Peak exposure

The time at which a substance is at its highest concentration in the workplace during the day.

**Permanent noise-
induced threshold
shift (PNITS)**

Permanent, non-reversible loss of hearing.

**Personal protective
devices**

A method of reducing exposure to hazards by which protections are placed directly on the worker, such as using ear muffs or ear plugs to reduce noise rather than quieting down a noisy machine. Personal protective devices should be utilized only as a temporary measure or in situations where other types of controls are unfeasible.

Sensitization

A type of allergic reaction to a substance from repeated exposure over a period of time.

Solvent

A liquid substance that is capable of dissolving another substance. Examples are water, carbon tetrachloride, perchloroethylene.

Stress

A physiological condition which over a long period of time can result in a number of diseases: ulcers, colitis, migraines, asthma, coronary heart disease. The condition can be caused by work related factors: physical working conditions; rate and pace of work; job dissatisfaction; psychological pressures.

Systemic	A general condition which affects the body as a whole.
Temporary threshold shift (TTS)	Temporary loss of hearing from noise.
Threshold limit value (TLV)	The maximum concentration of the exposure of a toxic substance that a worker is permitted by OSHA to be exposed to over an 8 hour day. This exposure can be exceeded, so long as the average daily exposure does not go over the limit. Common TLVs for HRs, TDMs, MVOs are benzene, 1 ppm; phenol, 5 ppm; cresol, 5 ppm; naptha, 20 ppm.
Time weighted average (TWA)	The average exposure over a given working period weighted by the duration of each exposure (usually over an 8 hour day).
Toxic	Poisonous; any substance which ingested, inhaled, or absorbed in small amounts can cause damage to the body.